TECHNICAL BULLETIN 39 JULY 1926

University of Minnesota
Agricultural Experiment Station

Tables for Determining Contents of Standing Timber in Minnesota, Michigan, and Wisconsin

Compiled by
Cloquet Forest Experiment Station
Division of Forestry
and
Lake States Forest Experiment Station,
Forest Service, U.S. Department of Agriculture

UNIVERSITY FARM, ST. PAUL

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INTRODUCTION

A knowledge of the contents of standing trees, whether in board measure, cubic feet, cords, ties, or other forest products is basic to any woods operation. Tables showing the contents of average trees of given sizes according to some unit of measure are known as **volume tables.** Such tables are used in estimating the amount of standing timber for purposes of purchase or sale and for logging operations; and to determine the stand and growth of timber for the purpose of appraisal of fire damage, trespass, and forest valuation, and management in general; and also for all kinds of scientific studies involving volume, growth, and yield. The need of volume tables is therefore apparent.

The purpose of this bulletin is to bring together in a handy and readily available form the volume tables for the forest trees of the Lake States—Michigan, Wisconsin, and Minnesota. Some 93 volume tables, covering 25 species, have been included. Of these, 31 tables have not been published hitherto and for 15 tables the actual field data were collected and the computations made by the Cloquet and Lake States Forest Experiment Stations.

Very few or no volume tables for the Lake States region are as yet available for such species as balsam; white cedar; cottonwood; elm; hickories; red maple; black, bur, red, scarlet, and white oaks; second-growth red and white pines; and black spruce. As these are important commerical species in the Lake States, it was thought advisable, at least for the present, to include for these species volume tables prepared in other regions, as the Northeast. These tables may be too high or too low for local conditions in the Lake States. They are, however, the best that are available at present, and if used with occasional checks, may prove serviceable.

The volume tables in this bulletin are not equally reliable. Some are not based on a sufficiently large number of trees to be fully representative of all conditions. Others were not compiled with the same thoroness or by the same methods and therefore are not truly comparable. On each table, the number of trees upon which it is based, the locality in which the data were collected, the name of the person who collected the field data, and the compilor of the table, if it were not done by the same person, are indicated. Other information is given that may prove helpful in an intelligent application of the tables.

All volume tables have limitations and their use requires judgment and knowledge of conditions under which they are to be applied.

Volume tables are based on measurements taken on a large number of felled trees. The values given are therefore average values. It can not be expected that a single tree taken at random will have the exact contents given in the table. It is only by applying the average values to a large number of trees that a fairly reliable estimate of the contents of standing timber can be secured.

To apply volume tables for standing trees the diameter, height, or number of logs, of each tree for a given species, must be determined first. The values corresponding to these diameters and heights or number of logs, are found in the table based on the desired unit of measure and the degree of utilization to which it is expected the stand will be cut. The diameters are measured outside of bark at 4½ feet above the ground. They may be measured with a diameter tape, calipers, or cruisers sticks, or, as is the custom with experienced estimators, by eye. Heights are obtained by estimate or by use of a height-measuring instrument.

In making available the volume tables for the Lake States region for use of lumbermen, foresters, botanists, and other students of forest trees, the aim is to provide the first step toward a gradual improvement in our methods of determining the contents of forest stands. It is hoped that these tables will be checked in actual field use and any serious deviations from actual conditions observed and corrected and new tables compiled for species for which no tables exist.

Table 1

BLACK ASH

(Fraxinus nigra)

New Hampshire, New York, Michigan, Indiana

Sterrett
Barrows **1912** Scribner Decimal C

Diameter breast high	Total height of tree—feet						Diameter inside bark of top	Basis
	60	70	80	90	100	110		
	Volume—board feet, in tens							
Inches							*Inches*	*Trees*
8	2.6	3.5	4.7				6	4
9	3.7	5.0	6.2				6	6
10	5.0	6.5	7.9				6	8
11	6.1	8.1	9.7				6	5
12	7.6	9.9	12	15			6	10
13	9.1	12	14	18			6	16
14	11	14	17	21			6	4
15	13	16	20	24			6	9
16	15	19	23	27	31		6	12
17	17	22	27	31	36		6	4
18	20	26	31	35	40	44	6	7
19		30	35	39	45	49	6	5
20		34	40	44	50	55	6	3
21		39	45	49	56	61	7	8
22		44	50	55	62	68	7	2
23		49	56	62	68	75	8	2
24		55	62	69	76	82	9	1
25			68	76	84	91	9	2
26			74	83	92	100	10	1
27			81	91	100	109	10	2
28			88	99	109	119	11	1
29			95	106	118	129	11	1
30			103	114	127	139	12	1
31			110	123	136	150	13	
32			117	131	146	160	13	
Total								114

Trees 75 to 300 years old. Stump height, 1 foot. Based on taper curves scaled mostly as 16.3-foot logs, with a few shorter logs where necessary. Trees from Grafton County, N. H.; Franklin County, N. Y.; Ontonagon County, Mich.; and Wayne County, Ind.

Table 78, U. S. Dept. of Agr. Bul. Volume Tables for the Important Timber Trees of the United States. Part III.

Table 2

BLACK ASH

(*Fraxinus nigra*)

New Hampshire, New York, Michigan, Indiana

Sterrett
Barrows **1912** Scribner Decimal C

Diameter breast high	Number of 16-foot logs									Diameter inside bark of top	Basis
	2	2½	3	3½	4	4½	5	5½	6		
	Volume—board feet, in tens										
Inches										*Inches*	*Trees*
8	3.8	5.2	6.5	.....	.....	.....	.....	.....	.....	6	4
9	4.2	5.7	7.2	.....	.....	.....	.....	.....	.....	6	6
10	4.7	6.3	8	10	.....	.....	.....	.....	.....	6	8
11	5.3	7	9	12	.....	.....	.....	.....	.....	6	5
12	5.9	8	10	13	16	.....	.....	.....	.....	6	10
13	6.6	9	11	15	18	.....	.....	.....	.....	6	16
14	7.4	10	13	17	20	23	.....	.....	.....	6	4
15	8.3	11	15	19	23	26	.....	.....	.....	6	9
16	9.3	13	17	21	25	29	34	.....	.....	6	12
17	.....	14	19	24	28	33	37	.....	.....	6	4
18	.....	16	21	27	32	36	42	46	.....	6	7
19	.....	18	24	30	36	40	46	51	.....	6	5
20	.....	19	27	34	40	45	51	57	61	6	3
21	.....	.....	30	38	44	50	57	63	68	7	8
22	.....	.....	34	43	50	56	63	70	75	7	2
23	.....	.....	38	49	56	63	70	77	83	8	2
24	.....	.....	43	55	63	71	77	85	92	9	1
25	.....	.....	.....	62	70	79	86	94	102	9	2
26	.....	.....	.....	69	78	87	95	103	112	10	1
27	.....	.....	.....	77	86	96	104	113	122	10	2
28	.....	.....	.....	85	95	105	114	124	134	11	1
29	.....	.....	.....	93	104	114	124	135	145	11	1
30	.....	.....	.....	102	113	123	134	146	157	12	1
Total	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	114

Trees 75 to 300 years old. Stump height, 1 foot. Based on taper curves compiled by W. B. Barrows; scaled mostly as 16.3-foot logs, with a few shorter logs where necessary. Trees from Grafton County, N. H.; Franklin County, N. Y.; Ontonagon County, Mich.; and Wayne County, Ind.

Table 46, U. S. Dept. of Agr. Bul. 299, The Ashes. W. D. Sterrett. 1915.

Table 3

BLACK ASH

(Fraxinus nigra)

New Hampshire, New York, Michigan, Indiana

Sterrett
Barrows **1912** **Cords**

Diameter breast high	Total height of tree—feet						Bark	Basis
	60	70	80	90	100	110		
	Volume—cords							
Inches							*Per ct.*	*Trees*
6	.066	.077	.088				18.0	
7	.088	.103	.117				17.6	2
8	.114	.133	.152				17.2	4
9	.143	.167	.190				16.8	6
10	.179	.208	.238				16.4	8
11	.212	.248	.283				16.0	5
12	.253	.296	.338	.381			15.7	10
13	.293	.342	.391	.440			15.3	16
14	.341	.398	.454	.511			14.9	4
15	.388	.453	.518	.583			14.5	9
16	.442	.516	.590	.663	.737		14.2	12
17	.495	.578	.660	.742	.825		13.8	4
18	.554	.647	.739	.832	.923		13.5	7
19		.714	.815	.918	1.019		13.1	5
20		.790	.903	1.015	1.128	1.241	12.8	3
21		.865	.990	1.113	1.236	1.360	12.4	8
22		.948	1.083	1.219	1.354	1.490	12.1	2
23		1.028	1.175	1.322	1.469	1.617	11.8	2
24		1.118	1.277	1.437	1.597	1.756	11.4	1
25			1.375	1.547	1.718	1.891	11.1	2
26			1.487	1.673	1.859	2.046	10.8	1
27			1.605	1.805	2.006	2.206	10.5	2
28			1.711	1.924	2.138	2.352	10.2	1
29			1.834	2.063	2.293	2.582	9.9	1
30			1.962	2.208	2.453	2.697	9.6	1
Total								116

To reduce to cubic feet, including stump, multiply the number of cords in each case by 100.

Volume includes bark. Based on taper tables compiled by W. B. Barrows. Trees 75 to 300 years old.

Table 45, U. S. Dept. of Agr. Bul. 299, The Ashes. W. D. Sterrett. 1915.

Table 4

BLACK ASH

(*Fraxinus nigra*)

New Hampshire, New York, Michigan, Indiana

Sterrett
Barrows **1912** Cubic feet

Diameter breast high	Total height of tree—feet						Factors to multiply by to convert to cu. ft., including bark	Basis
	60	70	80	90	100	110		
	Peeled volume—cubic feet							
Inches								*Trees*
6	5.4	6.3	7.2				1.22	
7	7.3	8.5	9.7				1.21	2
8	9.4	11.0	12.6				1.21	4
9	11.9	13.9	15.8				1.20	6
10	14.9	17.3	19.8				1.20	8
11	17.8	21.0	24.0				1.19	5
12	21.0	25.0	28.0	32			1.19	10
13	25.0	29.0	33.0	37			1.18	16
14	29.0	34.0	39.0	43			1.18	4
15	33.0	39.0	44.0	50			1.17	9
16	38.0	44.0	50.0	57	63		1.17	12
17	43.0	50.0	57.0	64	71		1.16	4
18	48.0	56.0	64.0	72	80		1.16	7
19		62.0	71.0	80	89		1.15	5
20		69.0	78.0	88	98	108	1.15	3
21		76.0	87.0	98	108	119	1.14	8
22		83.0	95.0	107	119	131	1.14	2
23		91.0	104.0	117	130	143	1.13	2
24		99.0	113.0	127	141	155	1.13	1
25			123.0	138	153	169	1.12	2
26			133.0	149	166	183	1.12	1
27			143.0	161	179	197	1.12	2
28			154.0	173	193	212	1.11	1
29			165.0	186	207	227	1.11	1
30			177.0	199	221	243	1.11	1
Basis								116

Volume in cubic feet of stem wood, exclusive of bark.
Based on taper curves.
Trees 75 to 300 years old.
Table 44, U. S. Dept. of Agr. Bul. 299, The Ashes. W. D. Sterrett. 1915.

Table 5

SECOND-GROWTH WHITE ASH

(*Fraxinus americana*)

Vermont, New York, Michigan, Indiana, Tennessee

Sterrett
Barrows **1912** Scribner Decimal C

Diameter breast high	Total height of tree—feet								Diameter inside bark of top	Basis
	30	40	50	60	70	80	90	100		
	Volume—board feet, in tens									
Inches									*Inches*	*Trees*
8	0.5	0.8	1.3	1.9	2.5	3.2	3.9	.....	6	80
9	0.8	1.4	2.0	2.9	3.7	4.7	5.7	.....	6	57
10	1.2	2.0	2.7	4.0	4.9	6.4	7.6	9.1	6	63
11	1.7	2.6	3.6	5.0	6.3	8.1	9.7	11	6	54
12	2.2	3.4	4.7	6.4	7.9	10	12	14	6	45
13	2.8	4.3	5.8	7.8	9.6	12	14	17	6	33
14	3.5	5.2	7.0	9.3	12	14	17	20	6	28
15	.....	6.3	8.5	11	14	17	20	23	6	19
16	.....	7.3	9.9	13	16	19	23	26	6	14
17	.....	.....	12	15	19	22	26	30	6	10
18	.....	.....	13	17	21	25	29	33	6	6
19	.....	.....	15	19	24	28	33	38	6	6
20	.....	.....	17	22	27	32	37	42	6	3
21	.....	.....	19	24	30	35	41	47	7	4
22	.....	.....	21	27	33	39	46	52	7	1
Total	.....	.....	.....	.....	.....	.....	.....	.....	.....	423

Trees less than 75 years old. Stump height, 1 foot. Based on taper curves; scaled mostly as 16.3-foot logs, with a few shorter logs where necessary. Trees from Chittenden, Orange, Washington, and Windsor Counties, Vt.; Herkimer, Oswego, and Otsego, Counties, N. Y.; Montgomery and Wabash Counties, Ind.; Leelanau County, Mich.; and Stewart County, Tenn.

Table 82, U. S. Dept. of Agr. Bul. Volume Tables for the Important Timber Trees of the United States. Part III.

Table 6

WHITE ASH

(Fraxinus americana)

Vermont, New York, Michigan, Indiana, Tennessee

Sterrett
Barrows — **1912** — Scribner Decimal C

Diameter breast high	Number of 16-foot logs									Diameter inside bark of top	Basis
	2	2½	3	3½	4	4½	5	5½	6		
	Volume—board feet, in tens										
Inches										*Inches*	*Trees*
8	3.2	4.3	5.1	6.9	.....	.....	.....	.....	.....	6	13
9	3.7	5.0	6.0	8.0	.....	.....	.....	.....	.....	6	23
10	4.2	5.8	7.0	9.1	.....	.....	.....	.....	.....	6	28
11	4.9	6.8	8.0	10	.....	.....	.....	.....	.....	6	42
12	5.7	7.8	9.3	12	14	.....	.....	.....	.....	6	49
13	6.6	9.0	11	13	16	.....	.....	.....	.....	6	46
14	7.7	10	12	15	18	20	23	.....	.....	6	51
15	9.0	12	14	17	20	23	26	.....	.....	6	32
16	10	13	16	19	22	26	29	33	37	6	51
17	12	15	18	21	25	29	33	37	41	6	30
18	13	17	20	24	28	32	37	41	46	6	24
19	15	19	23	27	32	36	42	46	52	6	21
20	17	21	25	30	36	41	47	52	59	6	17
21	19	23	28	34	40	46	52	59	66	7	10
22	21	26	31	38	45	51	59	66	75	7	11
23	.....	29	35	42	50	58	66	75	84	8	7
24	.....	32	38	46	55	65	74	84	94	9	1
25	.....	35	42	51	61	73	83	94	105	9	5
26	.....	38	46	57	68	81	92	105	117	10	2
27	.....	41	51	63	76	89	102	116	130	10	2
28	.....	45	56	69	84	98	113	128	144	11	2
29	.....	48	61	76	92	107	124	141	159	11	3
30	.....	52	66	83	101	117	136	155	175	12	1
31	.....	.....	72	90	110	128	149	169	191	13	2
32	.....	.....	79	99	119	139	162	185	208	13	1
33	.....	.....	86	107	129	151	176	202	226	14	.....
34	.....	.....	93	116	140	164	191	220	247	14	.....
35	.....	.....	100	125	150	176	205	238	269	15	1
36	.....	.....	108	134	161	189	221	256	290	16	.....
37	.....	.....	116	144	172	202	236	274	312	16	.....
38	.....	.....	124	154	183	216	252	293	335	17	.....
39	.....	.....	132	165	195	231	269	313	362	17	.....
40	.....	.....	141	176	206	247	287	334	390	18	.....
Basis	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	475

Trees 75 to 150 years old. Stump height, 1 foot. Based on taper curves; scaled mostly as 16.3-foot logs, with a few shorter logs where necessary.
Table 37. U. S. Dept. of Agr. Bul. 299, The Ashes. W. D. Sterrett. 1915.

Table 7

SECOND-GROWTH WHITE ASH

(Fraxinus americana)

Vermont, New York, Michigan, Indiana, Tennessee

Sterrett
Barrows **1912** **Cords**

Diameter breast high	Total height of tree—feet								Bark	Basis
	20	30	40	50	60	70	80	90		
	Total volume—cords									
Inches									*Per cent*	*Trees*
4	.009	.014	.017	.022	.026	.031	.....	.....	18.6	65
5	.013	.020	.027	.033	.040	.046	.054	.....	18.3	70
6	.020	.028	.038	.048	.057	.067	.076	.....	17.9	81
7	.....	.039	.051	.064	.076	.090	.102	.115	17.6	57
8	.....	.050	.067	.082	.099	.116	.132	.149	17.3	80
9	.....	.061	.083	.103	.124	.144	.164	.185	17.0	57
10	.....	.....	.103	.128	.155	.180	.206	.232	16.7	63
11	.....	.....	.124	.155	.185	.216	.247	.278	16.4	54
12	.....	.....	.146	.183	.220	.257	.293	.330	16.1	45
13	.....	.....	.....	.213	.256	.299	.342	.384	15.8	33
14	.....	.....	.....	.247	.295	.345	.394	.444	15.5	28
15	.....	.....	.....	.283	.340	.396	.453	.510	15.2	19
16	.....	.....	.....	.322	.387	.451	.516	.579	15.0	14
17	.....	.....	.....	.....	.433	.504	.577	.649	14.7	10
18	.....	.....	.....	.....	.484	.565	.646	.727	14.4	6
19	.....	.....	.....	.....	.539	.629	.720	.808	14.2	6
20	.....	.....	.....	.....	.592	.690	.789	.887	13.9	3
21	.....	.....	.....	.....	.654	.763	.872	.981	13.7	4
22	.....	.....	.....	.....	.717	.836	.956	1.075	13.5	1
Total	.....	.....	.....	.....	.....	.....	.....	.....	.....	696

Volume of stem, including bark.

To reduce to cubic feet, including stump, multiply the number of cords in each case by 100.

Trees under 75 years. Table based on taper curves.

Table 33, U. S. Dept. of Agr. Bul. 299, The Ashes. W. D. Sterrett. 1915.

Table 8

SECOND-GROWTH WHITE ASH

(Fraxinus americana)

Vermont, New York, Michigan, Indiana, Tennessee

Sterrett
Barrows

1912

Cubic feet

Diameter breast high	Total height of tree—feet								Factors to multiply by to convert to cubic feet including bark	Basis
	20	30	40	50	60	70	80	90		
	Peeled volume—cubic feet									
Inches										*Trees*
2	0.2	0.2	0.3	.....	.....	.....	.....	.....	.....	63
3	0.4	0.6	0.8	.....	.....	.....	.....	.....	.....	47
4	0.7	1.1	1.4	1.8	2.1	2.5	.....	.....	1.23	65
5	1.1	1.6	2.2	2.7	3.3	3.8	.....	.....	1.22	70
6	1.6	2.3	3.1	3.9	4.7	5.5	6.2	.....	1.22	81
7	.....	3.2	4.2	5.3	6.3	7.4	8.4	.....	1.21	57
8	.....	4.1	5.5	6.8	8.2	9.6	10.9	12.3	1.21	80
9	.....	5.1	6.9	8.6	10.3	12.0	13.7	15.4	1.20	57
10	.....	.....	8.6	10.7	12.9	15.0	17.2	19.3	1.20	63
11	.....	.....	10.3	12.9	15.4	18.0	21.0	23.0	1.20	54
12	.....	.....	12.3	15.4	18.5	22.0	25.0	28.0	1.19	45
13	.....	.....	.....	17.9	22.0	25.0	29.0	32.0	1.19	33
14	.....	.....	.....	21.0	25.0	29.0	33.0	38.0	1.18	28
15	.....	.....	.....	24.0	29.0	34.0	38.0	43.0	1.18	19
16	.....	.....	.....	27.0	33.0	38.0	44.0	49.0	1.18	14
17	.....	.....	.....	.....	37.0	43.0	49.0	55.0	1.17	10
18	.....	.....	.....	.....	41.0	48.0	55.0	62.0	1.17	6
19	.....	.....	.....	.....	46.0	54.0	61.0	69.0	1.17	6
20	.....	.....	.....	.....	51.0	60.0	68.0	77.0	1.16	3
21	.....	.....	.....	.....	56.0	66.0	75.0	85.0	1.16	4
22	.....	.....	.....	.....	62.0	72.0	82.0	93.0	1.16	1
Total	.....	.....	.....	.....	.....	.....	.....	.....	.....	806

Trees under 75 years. Based on taper tables. Stump height, 1 foot. Volume does not include bark.

Table 31, U. S. Dept. of Agr. Bul. 299, The Ashes. W. D. Sterrett. 1915.

Table 9

WHITE ASH

(*Fraxinus americana*)

Vermont, New York, Michigan, Indiana, Tennessee

Sterrett
Barrows

1912

Cubic feet

Diameter breast high	Total height of tree—feet								Factors to multiply by to convert to cubic feet including bark	Basis
	50	60	70	80	90	100	110	120		
	Peeled volume—cubic feet									
Inches										*Trees*
6	4.0	4.8	5.6	.....	.....	.....	.....	.....	1.38	5
7	5.4	6.5	7.6	.....	.....	.....	.....	.....	1.36	8
8	7.0	8.4	9.8	11.2	.....	.....	.....	.....	1.34	13
9	8.8	10.6	12.3	14.1	.....	.....	.....	.....	1.32	23
10	11.0	13.2	15.4	17.6	19.8	.....	.....	.....	1.31	28
11	13.2	15.8	18.5	21.	24.	.....	.....	.....	1.30	42
12	15.8	19.	22.	25.	28.	32	.....	.....	1.28	49
13	18.4	22.	26.	29.	33.	37	.....	.....	1.27	46
14	21.	26.	30.	34.	39.	43	47	.....	1.26	51
15	25.	30.	34.	39.	44.	49	54	.....	1.25	32
16	28.	34.	39.	45.	50.	56	62	67	1.24	51
17	32.	38.	44.	51.	57.	63	70	76	1.23	30
18	35.	42.	50.	57.	64.	71	78	85	1.22	24
19	39.	47.	55.	63.	71.	79	87	95	1.21	21
20	44.	52.	61.	70.	78.	87	96	105	1.20	17
21	48.	58.	67.	77.	87.	96	106	116	1.19	10
22	53.	63.	74.	84.	95.	106	116	127	1.18	11
23	.....	69.	81.	92.	104.	116	127	139	1.17	7
24	.....	75.	88.	100.	113.	126	138	151	1.17	1
25	.....	82.	95.	109.	123.	136	150	164	1.16	5
26	.....	89.	103.	118.	133.	148	162	177	1.15	2
27	.....	.....	111.	127.	143.	159	175	191	1.15	2
28	.....	.....	120.	137.	154.	171	188	205	1.14	2
29	.....	.....	129.	147.	165.	184	202	220	1.14	3
30	.....	.....	137.	157.	177.	196	216	236	1.13	1
31	.....	.....	.....	168.	189.	210	231	252	1.13	2
32	.....	.....	.....	179.	201.	224	246	268	1.12	1
33	.....	.....	.....	190.	214.	238	261	285	.....	.....
34	.....	.....	.....	202.	227.	252	278	303	.....	.....
35	.....	.....	.....	214.	240.	267	294	321	.....	1
36	.....	.....	.....	226.	255.	283	311	339	.....	.....
Total	.....	.....	.....	.....	.....	.....	.....	.....	.....	488

Trees from 75 to 150 years old. Based on taper tables. Stump height, 1 foot. Table excludes bark.

Table 32, U. S. Dept. of Agr. Bul. 299, The Ashes. W. D. Sterrett. 1915.

Table 10

SECOND-GROWTH ASPEN

(*Populus tremuloides*)

Minnesota

Gevorkiantz, S. R. **1926** International ⅛ inch kerf.

Diameter breast high	Number of 16-foot logs								Basis
	1	1½	2	2½	3	3½	4	4½	
	Volume—board feet								
Inches									*Trees*
6	15	20	26	31					43
7	15	24	32	40					42
8	15	27	39	50	60				47
9	15	30	44	58	74	90			37
10		34	51	68	86	104	122		36
11		37	58	79	100	120	144	167	22
12		41	66	92	118	144	171	198	26
13			75	106	138	170	202	233	23
14			86	123	161	199	237	274	18
15				142	186	230	276	319	5
16				163	213	264	319	369	
Basis	36	36	32	35	44	39	68	9	299

Stump height, 1 foot; top diameter inside of bark, 5 inches; trees scaled in 16-foot lengths.

Compiled by the Frustum Form Factor method from data collected by E. E. Probstfield. A. F. Verrall assisted in the computations.

Difference between total volume of trees used as a basis and the interpolated volumes taken from table, 0.13 per cent.

Average deviation of individual tree volumes from interpolated tabular volumes, +5.33 per cent.

Block indicates extent of original data.

Preliminary Table.

Table 11

SECOND-GROWTH ASPEN

(*Populus tremuloides*)

Minnesota

Gevorkiantz, S. R. **1926** Scribner Decimal C

Diameter breast high	Number of 16-foot logs								Basis
	1	1½	2	2½	3	3½	4	4½	
	Volume—board feet, in tens								
Inches									*Trees*
7	2	3	4	6					20
8	2	3	4	6	7				47
9	2	3	5	6	8	9			37
10		3	5	7	8	10	12		36
11		4	6	7	9	11	13	15	22
12		4	6	8	10	13	15	17	26
13			7	9	12	14	17	20	23
14			8	11	14	16	19	23	18
15				12	15	19	22	26	5
16				14	17	22	26	30	
Basis	22	34	27	45	25	45	35	1	234

Stump height, 1 foot; top diameter inside of bark, 6 inches. Scaled in 16-foot logs. Compiled by the Frustum Form Factor method from data collected in 1925 by E. E. Probstfield. A. F. Verrall assisted in the computations.

Difference between total volume of trees used as a basis and the interpolated volumes taken from the table, 0.35 per cent.

Average deviation of individual tree volumes from interpolated tabular volumes, +6.48 per cent.

Block indicates the extent of the original data.

Preliminary Table.

Table 12

SECOND-GROWTH ASPEN

(*Populus tremuloides*)

Minnesota

Gevorkiantz, S. R. **1926** Cords

Diameter breast high	Total height of tree—feet														Basis
	30	35	40	45	50	55	60	65	70	75	80	85	90	95	
	Volume—cords														
Inches															*Trees*
4	.01	.01	.02	.02	.02	.03	.03	.04							84
5	.02	.03	.03	.04	.04	.05	.05	.06	.06						74
6	.03	.04	.05	.06	.06	.07	.07	.08	.09	.10					61
7			.06	.07	.08	.09	.10	.11	.12	.13	.14				42
8			.08	.09	.10	.11	.12	.13	.14	.16	.17	.18			47
9					.12	.13	.15	.16	.17	.19	.20	.21			38
10					.14	.16	.17	.19	.20	.22	.23	.25	.26		36
11						.18	.20	.22	.23	.25	.27	.29	.31		24
12							.23	.25	.27	.29	.31	.33	.35		27
13								.28	.30	.32	.35	.37	.39	.41	21
14									.34	.36	.38	.41	.43	.46	18
15									.37	.40	.43	.46	.48	.51	5
16									.42	.44	.48	.51	.54	.57	
Basis		4	25	57	63	43	44	43	33	38	47	57	23	1	477

Standard cords, 4x4x8 feet.

Volume of peeled stem above a one-foot stump to a top diameter inside of bark of 3 inches.

Compiled from the merchantable volume in cubic feet by dividing the volume per tree by the number of cubic feet per cord for each D. B. H. class.

Data collected in 1925 by E. E. Probstfield.

Block indicates extent of original data.

Table 13

SECOND-GROWTH ASPEN

(Populus tremuloides)

Minnesota

Gevorkiantz, S. R. **1926** Cubic feet

Diameter breast high	Total height of tree—feet															Basis
	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	
	Total volume—cubic feet															
Inches																*Trees*
2	.26	.31	.37	.42												31
3	.57	.69	.80	.92	1.0	1.1	1.3									74
4	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6							84
5	1.6	1.9	2.2	2.5	2.8	3.1	3.4	3.7	4.0	4.3						74
6		2.7	3.1	3.5	4.0	4.4	4.9	5.3	5.8	6.2	6.6					61
7				4.8	5.4	6.0	6.6	7.2	7.8	8.3	8.9	9.5	10.1			42
8				6.2	7.0	7.7	8.5	9.3	10.0	10.8	11.6	12.4	13.1			47
9						9.7	10.7	11.6	12.6	13.6	14.5	15.5	16.5			38
10						11.9	13.1	14.3	15.4	16.6	17.8	19.0	20.2	21.4		36
11							15 7	17.1	18.6	20.0	21.4	22.9	24.3	25.7		24
12								20.2	21.9	23.6	25.3	27.0	28.7	30.4		27
13									25.6	27.6	29.6	31.6	33.5	35.5	37.5	23
14										31.9	34.1	36.4	38.7	41.0	43.3	18
15										36.4	39.0	41.6	44.2	46.8	49.4	5
16										41	44	47	50	53	56	
Basis	9	20	47	52	63	63	43	44	43	33	38	47	57	24	1	584

Volume includes stump, stem, and top without bark.

Compiled by the form factor method from data collected by E. E. Probstfield in 1925.

Cubed in 8-foot sections by Smalian's formula. A. F. Verrall assisted in the computations.

Block indicates the extent of the original data.

Difference between total volume of trees used as a basis and volume as taken from the table, 0.08 per cent.

Average deviation of individual tree volumes from interpolated tabular volumes, ±5.33 per cent.

Table 14

SECOND-GROWTH ASPEN

(*Populus tremuloides*)

Minnesota

Gevorkiantz, S. R. **1926** Merchantable cubic feet

Diameter breast high	Total height of tree—feet														Basis
	30	35	40	45	50	55	60	65	70	75	80	85	90	95	
	Merchantable volume—cubic feet														
Inches															*Trees*
4	.58	.76	.93	1.1	1.3	1.5	1.6	1.9							84
5	1.3	1.5	1.8	2.2	2.5	2.8	3.1	3.4	3.7						74
6	2.2	2.5	2.9	3.4	3.8	4.2	4.7	5.2	5.6	6.1					61
7			4.2	4.8	5.4	5.9	6.5	7.2	7.8	8.4	8.9	9.5			42
8			5.6	6.3	7.0	7.8	8.6	9.4	10.2	11.0	11.7	12.5			47
9					8.9	9.9	10.8	11.8	12.8	13.8	14.8	15.8			38
10					11.0	12.2	13.4	14.6	15.8	17.0	18.2	19.4	20.6		36
11						14.7	16.2	17.6	19.1	20.5	22.0	23.4	24.9		24
12							19.2	20.9	22.6	24.4	26.1	27.7	29.5		27
13								24.5	26.5	28.5	30.5	32.4	34.4	36.4	21
14									30.7	33.0	35.2	37.5	39.8	42.1	18
15									35.1	37.7	40.2	42.8	45.4	48.0	5
16									40	43	46	49	52	55	
Basis		4	25	57	63	43	44	43	33	38	47	57	23	1	477

Volume inside of bark.

Stump height, 1 foot; top diameter inside of bark, 3 inches.

Compiled by expressing merchantable volume as a percentage of the total volume.

Data collected in 1925 by E. E. Probstfield. A. F. Verrall assisted in the computations.

Difference between total volume of trees used as a basis and the volumes as taken from the table, 0.16 per cent.

Average deviation of individual tree volumes from interpolated tabular volumes, ±6.05 per cent.

Block indicates extent of original data.

Table 15

BALSAM FIR

(*Abies balsamea*)

Maine

Zon | **1914** | Scribner

Diameter breast high	Swamp					Hardwood slope and flat					
	Total height of tree—feet				Diameter inside bark of top	Total height of tree—feet					Diameter inside bark of top
	40	50	60	70		40	50	60	70	80	
	Volume—board feet					Volume—board feet					
Inches					*Inches*						*Inches*
7	14	17	20	22	5.8	13	19	27	.....	.....	5.8
8	19	23	27	32	5.9	21	26	33	40	.....	5.9
9	24	31	37	44	6.1	29	34	41	48	56	6.0
10	.....	39	48	57	6.2	38	45	52	60	70	6.1
11	.....	48	60	73	6.4	.....	56	65	75	86	6.2
12	.....	57	73	92	6.6	.....	69	80	92	107	6.3
13	.....	66	87	110	6.8	.....	82	95	111	130	6.4
14	.....	.....	.....	.....	.....	.....	.....	111	132	155	6.4
15	.....	.....	.....	.....	.....	.....	.....	127	153	182	6.5
16	.....	.....	.....	.....	.....	.....	.....	144	174	209	6.6

Based upon analysis of 1,056 trees. Stump height, 1 foot.
Table 41, U. S. Dept. of Agr. Bul. 55, Balsam Fir. 1914.

Table 16

BALSAM FIR

(*Abies balsamea*)

Ontanagon County, Michigan

Brotherton **1910** Scribner

Diameter breast high	Number of 16-foot logs			
	1	2	3	4
	Volume—board feet			
Inches				
10	30	50	95	
12	55	75	100	
14	80	135	165	
16	95	190	200	
18	140	240	300	335
20	185	325	405	475
22	240	400	500	550

Top diameter inside of bark, 8 inches.
Basis: approximately 100 trees for each D. B. H. class.
Data collected south of Bruce Crossing in 1902.

Table 17

BALSAM FIR

(*Abies balsamea*)

Maine, New York, New Hampshire

Zon — **1914** — Cords

Diameter breast high	Total height of tree—feet							Basis
	20	30	40	50	60	70	80	
	Total volume—cords							
Inches								*Trees*
3	.005	.008						26
4	.009	.016	.022					45
5	.016	.024	.033	.042				61
6		.034	.045	.057	.068			92
7		.045	.060	.075	.089	.105		314
8			.078	.096	.114	.137	.168	551
9			.099	.119	.142	.171	.203	399
10			.121	.146	.173	.204	.240	275
11			.146	.178	.206	.241	.278	199
12				.213	.244	.281	.320	120
13					.284	.324	.368	70
14						.366	.419	19
Total								2,171

Table 33, U. S. Dept. of Agr. Bul. 55, Balsam Fir. 1914.

Table 18

BALSAM FIR

(Abies balsamea)

New York

Zon **1914** Cubic feet

Diameter breast high	Total height of tree—feet							Basis
	20	30	40	50	60	70	80	
	Total volume—cubic feet							
Inches								*Trees*
3	0.54	0.81						28
4	0.96	1.43	1.91					45
5	1.48	2.21	2.95	3.60				61
6		3.15	4.19	5.23	6.24	7.24		122
7		4.24	5.63	7.01	8.37	9.72	11.07	326
8			7.25	9.01	10.76	12.51	14.24	566
9				11.19	13.38	15.55	17.71	411
10				13.59	16.23	18.86	21.47	275
11				16.10	19.25	22.36	25.50	217
12					22.38	26.06	29.72	119
13					25.71	29.94	34.14	76
14					29.12	33.98	38.74	16
15					32.77	38.14	43.59	0
16					36.53	42.52	48.59	0
Basis	23	64	156	503	836	500	91	2173

Table 19, U. S. Dept. of Agr. Bul. 55, Balsam Fir. 1914.

Table 19

BALSAM FIR

(*Abies balsamea*)

Algoma District, Ontario

McCarthy, E. F.
Mills, C. R. **1920** Cubic feet

Diameter breast high	Total height of tree—feet				Basis
	40	50	60	70	
	Total volume—cubic feet				
Inches					*Trees*
5	2.6	2.9			13
6	3.9	4.8			73
7	5.4	6.7	7.3		121
8		8.8	9.6	10.6	125
9		10.9	11.9	13.1	101
10		13.2	14.4	15.8	93
11		15.8	17.2	18.8	50
12		18.5	20.1	21.9	17
13				25.1	2
14				28.9	5
Basis					600

Data collected in Agawa River Valley, Twp. 27, R. 20.
Table of the Forestry Branch, Interior Dept., Canada.
Compiled by curving averages on height and D. B. H.

Table 20

BALSAM FIR

(Abies balsamea)

New York

Zon — **1914** — Cubic feet

Diameter breast high	Total height of tree—feet					Basis
	40	50	60	70	80	
	Merchantable volume—cubic feet					
Inches						*Trees*
6	3.5	4.0				19
7	4.5	5.1	5.9			115
8	5.9	6.8	8.0	9.1		274
9	7.6	8.9	10.4	11.9		209
10		11.2	13.0	14.8	16.6	133
11		13.6	15.6	17.6	19.8	91
12			18.3	20.9	23.6	57
13			21.1	24.5	27.7	31
14				28.4	32.2	7
15				32.9	37.5	7
16				37.8	43.2	4
Total						947

Volume without bark.
Average top diameter, inside bark, 4 inches.
Table 30, U. S. Dept. of Agr. Bul. 55, Balsam Fir. 1914.

Table 21

BALSAM FIR

(*Abies balsamea*)

Algoma District, Ontario

McCarthy, E. F.
Mills, C. R. **1920** **Cubic feet**

Diameter breast high	Total height of tree—feet				Basis
	40	50	60	70	
	Used volume—cubic feet				
Inches					*Trees*
5	1.5	1.9			13
6	2.5	2.9	3.5		73
7	3.5	4.2	5.0	6.0	121
8	4.8	5.7	6.7	8.0	125
9		7.2	8.7	10.2	101
10		8.9	10.8	12.7	93
11			13.1	15.3	50
12			15.5	18.1	17
13				21.0	2
14				24.1	5
Basis					600

Data collected in Agawa River Valley, Twp. 27, R. 20.
Table of the Forestry Branch, Interior Dept., Canada.
Compiled by curving averages on height and D. B. H.

Table 22

BASSWOOD

(*Tilia glabra*)

Michigan, Wisconsin

Frothingham
Barrows

1913

Scribner Decimal C

Diameter breast high	Number of 16-foot logs						Diameter inside bark of top	Basis
	2	2½	3	3½	4	4½		
	Volume—board feet, in tens							
Inches							*Inches*	*Trees*
8	3	5	6				6	6
9	4	5	7				6	9
10	4	6	8	10	13		6	7
11	5	7	9	11	14		6	8
12	6	8	10	13	16		7	7
13	8	9	12	15	18	22	7	9
14	9	11	14	17	20	24	7	7
15	10	13	16	19	23	27	8	17
16	12	15	18	22	26	30	8	17
17		17	21	25	29	34	9	20
18		19	24	28	33	38	9	18
19		21	27	32	37	43	10	14
20		24	30	36	42	48	10	31
21		27	34	40	47	54	11	21
22		30	38	45	52	60	12	14
23		34	42	50	58	67	12	17
24		38	47	56	65	75	13	19
25		41	52	62	72	83	14	14
26		45	57	68	79	92	15	17
27		50	62	75	87	101	15	8
28		54	68	82	96	110	16	9
29		59	74	89	104	119	17	6
30		64	80	97	113	129	17	4
31		69	87	105	122	140	18	8
32		75	94	113	131	150	18	3
33		81	101	121	141	161	19	3
34		87	108	129	150	172	20	4
35		94	115	138	160	183	20	1
36		101	124	147	170	195	21	
37		108	132	156	180	206	22	1
38		115	141	165	190	218	22	
39		122	149	175	200	230	23	
40		130	157	185	210	242	24	
Total								319

Charlevoix and Kalkaska Counties, Mich., Iron and Price Counties, Wis.
Height of stump, 1 foot. Scaled from taper curves, mostly in 16.3-foot logs, with a few shorter logs where necessary. Average utilization.
Table 38, U. S. Dept. of Agr. Bul. 285, The Northern Hardwood Forest. E. H. Frothingham. 1915

Table 23

BASSWOOD

(Tilia glabra)

Michigan, Wisconsin

Frothingham
Barrows

1913

Cords

Diameter breast high	Total height of tree—feet									Basis
	40	50	60	70	80	90	100	110	120	
	Volume—cords									
Inches										*Trees*
8	.08	.10	.12	.14	.15					6
9	.11	.14	.17	.20	.22					9
10	.14	.18	.22	.25	.28	.30				7
11		.22	.26	.31	.34	.37				8
12		.26	.32	.37	.41	.45	.48			7
13			.38	.45	.49	.54	.57			9
14			.45	.52	.58	.63	.67	.70		7
15			.53	.61	.68	.73	.78	.82		17
16			.61	.70	.78	.83	.89	.94	.98	17
17					.88	.94	1.00	1.06	1.12	20
18					.99	1.06	1.13	1.19	1.25	18
19					1.10	1.18	1.26	1.33	1.40	14
20					1.23	1.30	1.39	1.47	1.55	31
21					1.36	1.44	1.52	1.62	1.70	21
22					1.49	1.58	1.67	1.77	1.86	14
23					1.64	1.73	1.83	1.93	2.03	17
24					1.80	1.89	1.99	2.10	2.21	19
25					1.95	2.05	2.15	2.27	2.40	14
26					2.10	2.21	2.32	2.44	2.58	17
27					2.28	2.39	2.50	2.64	2.78	8
28					2.46	2.58	2.70	2.84	3.00	9
29					2.66	2.80	2.96	3.08	3.24	6
30					2.87	3.01	3.14	3.31	3.48	4
31						3.24	3.38	3.55	3.74	8
32						3.49	3.66	3.84	4.04	3
33						3.78	3.94	4.14	4.35	3
34						4.04	4.22	4.43	4.66	4
35						4.32	4.53	4.74	4.98	1
36							4.85	5.09	5.33	
37							5.14	5.39	5.65	1
38							5.46	5.73	6.00	
39							5.78	6.07	6.34	
40							6.10	6.40	6.68	
Total										319

Charlevoix and Kalkaska Counties, Mich.; Iron and Price Counties, Wis.

Compiled from Table 24. Volume includes stem wood, bark, and branch wood. Minimum branch wood taken, 5 feet long, 4 inches in diameter outside of bark at mid point.

Table 76, U. S. Dept. of Agr. Bul. Volume Tables for the Important Timber Trees of the United States. Part III.

Table 24

BASSWOOD

(Tilia glabra)

Michigan, Wisconsin

Frothingham
Barrows

1912

Cubic feet

Diameter breast high	Total height of tree—feet: 40	50	60	70	80	90	100	110	120	Volume of top-wood	Diameter inside bark of top	Per cent of bark	Basis trees: Logs	Tops
	Volume of logs including bark—cubic feet													
Inches										*Cu.ft.*	*In.*			
8	3.9	5.4	7.0	8	9	.....	.....	.....	.....	2.2	6	22.1	6	6
9	5.7	8.1	10.3	12	14	.....	.....	.....	.....	2.4	6	21.7	9	7
10	7.8	10.7	13.5	16	18	20	.....	.....	.....	2.6	6	21.2	7	6
11	.....	13.5	17.1	20	23	25	.....	.....	.....	2.8	6	20.8	8	7
12	.....	16.6	21.0	25	28	30	33	.....	.....	3.2	7	20.5	7	5
13	.....	.....	25.0	30	33	36	39	.....	.....	3.7	7	20.1	9	10
14	.....	.....	30.0	35	39	43	46	49	.....	4.3	7	19.7	7	6
15	.....	.....	34.0	41	46	49	53	56	.....	5.2	8	19.4	17	16
16	.....	.....	40.0	47	52	56	60	64	68	6.2	8	19.1	17	15
17	.....	.....	.....	.....	58	63	68	72	76	7.5	9	18.8	20	18
18	.....	.....	.....	.....	65	70	75	80	85	9.0	9	18.6	18	13
19	.....	.....	.....	.....	72	78	83	89	94	10.9	10	18.3	14	15
20	.....	.....	.....	.....	79	85	91	97	103	13.1	10	18.0	31	28
21	.....	.....	.....	.....	86	92	99	106	112	15.6	11	17.8	21	20
22	.....	.....	.....	.....	93	100	107	114	121	18.6	12	17.5	14	12
23	.....	.....	.....	.....	101	108	115	122	131	22.0	12	17.3	17	17
24	.....	.....	.....	.....	109	116	123	131	140	26.0	13	17.1	19	17
25	.....	.....	.....	.....	116	124	132	140	150	30.0	14	16.9	14	12
26	.....	.....	.....	.....	124	132	140	149	159	34.0	15	16.7	17	15
27	.....	.....	.....	.....	132	140	149	159	169	39.0	15	16.5	8	10
28	.....	.....	.....	.....	140	149	158	168	180	45.0	16	16.3	9	9
29	.....	.....	.....	.....	148	158	170	179	191	52.0	17	16.1	6	6
30	.....	.....	.....	.....	156	167	177	189	202	59.0	17	15.9	4	4
31	.....	.....	.....	.....	.....	176	187	199	214	67.0	18	15.7	8	8
32	.....	.....	.....	.....	.....	185	197	211	226	77.0	18	15.5	3	1
33	.....	.....	.....	.....	.....	195	208	222	238	88.0	19	15.4	3	3
34	.....	.....	.....	.....	.....	205	219	234	251	98.0	20	15.2	4	4
35	.....	.....	.....	.....	.....	215	230	247	265	109.0	20	15.1	1	1
36	.....	.....	.....	.....	.....	.....	242	260	279	121.0	21	14.9	.....	.....
37	.....	.....	.....	.....	.....	.....	255	274	293	131.0	22	14.7	1	.....
38	.....	.....	.....	.....	.....	.....	268	288	308	142.0	22	14.6	.....	.....
39	.....	.....	.....	.....	.....	.....	280	302	323	153.0	23	14.4	.....	.....
40	.....	.....	.....	.....	.....	.....	294	317	338	163.0	24	14.3	.....	.....
Total	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	319	291

Charlevoix and Kalkaska Counties, Mich., Iron and Price Counties, Wis.

The "log" volume is the solid contents of wood and bark between a stump height of one foot and the "diameter inside bark of top" shown in the twelfth column. The volume of "top" is that contained in the stem above this point, and in addition all branches suitable for cordwood having a diameter, outside bark, of 4 inches or more at the middle of a 5-foot stick.

Table 36, U. S. Dept. of Agr. Bul. 285, The Northern Hardwood Forest. E. H. Frothingham. 1915.

Table 25

BEECH

(*Fagus grandifolia*)

Michigan

Frothingham
Barrows **1912** Scribner Decimal C

Diameter breast high	Number of 16-foot logs								Diameter inside bark of top	Basis
	1	1½	2	2½	3	3½	4	4½		
	Volume—board feet, in tens									
Inches									*Inches*	*Trees*
6	1.6	2.5	3	4	5	.....	.....	.....	6	2
7	1.7	2.7	3	4	6	.....	.....	.....	6	13
8	1.8	2.9	4	5	7	8	.....	.....	6	20
9	2.0	3.2	4	6	8	10	.....	.....	6	11
10	2.2	3.7	5	7	9	11	13	.....	6	23
11	2.4	4.2	6	8	11	13	16	.....	6	22
12	2.6	4.7	7	9	12	15	18	21	7	30
13	2.8	5.3	8	11	14	18	21	24	7	19
14	3.0	6.0	9	12	16	20	24	28	7	25
15	3.3	6.8	11	14	18	23	27	31	8	26
16	3.6	7.7	12	16	21	25	30	35	8	28
17	.....	8.5	14	19	24	29	34	40	9	14
18	.....	9.5	16	21	27	32	39	45	9	14
19	.....	11.0	18	24	31	37	43	50	10	9
20	.....	.....	20	28	35	42	49	56	10	6
21	.....	.....	22	32	39	47	55	63	11	7
22	.....	.....	25	36	44	53	62	71	12	8
23	.....	.....	.....	40	50	60	69	80	12	4
24	.....	.....	.....	44	56	67	78	89	13	3
25	.....	.....	.....	.....	62	74	86	100	14	1
26	.....	.....	.....	.....	68	82	96	111	15	.....
Total	.....	.....	.....	.....	.....	.....	.....	.....	.....	285

Wexford County.

Scaled from taper curves, mostly in 16.3-foot logs, with a few shorter logs. Stump height, 1 foot. Average utilization.

Table 20, U. S. Dept. of Agr. Bul. 285, The Northern Hardwood Forest. E. H. Frothingham. 1915.

Table 26

BEECH

(*Fagus grandifolia*)

Michigan

Frothingham
Barrows **1912** **Cords**

Diameter breast high	Total height of tree—feet							Basis
	40	50	60	70	80	90	100	
	Volume—cords							
Inches								*Trees*
6	.027	.035	.044	.057				2
7	.056	.068	.088	.112				14
8	.085	.103	.128	.161	.176	.207		20
9	.117	.137	.165	.201	.228	.267		11
10	.151	.173	.205	.247	.284	.329	.380	23
11	.187	.213	.244	.297	.345	.399	.455	22
12	.224	.256	.287	.352	.412	.473	.535	30
13		.300	.329	.411	.485	.555	.624	19
14		.340	.376	.475	.564	.644	.721	25
15		.385	.423	.543	.649	.740	.824	26
16		.417	.472	.613	.739	.845	.940	28
17			.524	.691	.833	.957	1.060	14
18			.576	.771	.939	1.072	1.188	14
19				.860	1.048	1.197	1.323	9
20				.957	1.167	1.331	1.472	6
21				1.075	1.296	1.480	1.629	7
22				1.197	1.444	1.632	1.795	8
23				1.321	1.600	1.799	1.968	4
24						1.969	2.161	3
25						2.149	2.349	1
26						2.333	2.547	
Total								286

Wexford County.

Compiled from Table 27. Converting factor, 75 cubic feet per cord. Volume includes wood, bark, and branch wood above a 1-foot stump. Minimum branch wood taken, 5-foot stick, 2 inches outside of bark at middle.

Table 37, U. S. Dept. of Agr. Volume Tables for the Important Timber Trees of the United States. Part III.

Table 27

BEECH

(*Fagus grandifolia*)

Michigan

Frothingham
Barrows **1912** Cubic feet

Diameter breast high	Total height of tree—feet: 40		50		60		70		80		90		100		Diameter, inside bark at top	Per cent of bark	Basis, trees	
	Volume including bark—cubic feet																	
	Logs	Top	Logs	Top	Logs	Top	Logs	Top	Logs	Top	Logs	Top	Logs	Top			Logs	Tops
Inches															*In.*			
4	.....	0.7	.....	0.9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6	8.1	.....	3
5	.....	0.9	.....	1.1	.....	1.4	.....	.....	.....	.....	.....	.....	.....	.....	6	8.0	.....	3
6	1.0	1.0	1.3	1.3	1.7	1.6	2.4	1.9	.....	.....	.....	.....	.....	.....	6	7.9	2	5
7	2.9	1.3	3.5	1.6	4.7	1.9	6.2	2.2	.....	.....	.....	.....	.....	.....	6	7.8	14	16
8	4.9	1.5	5.9	1.8	7.4	2.2	9.6	2.5	10.4	2.8	12.4	3.1	.....	.....	6	7.7	20	15
9	7.1	1.7	8.2	2.1	10.0	2.4	12.3	2.8	13.9	3.2	16.5	3.5	.....	.....	6	7.6	11	15
10	9.4	1.9	10.7	2.3	12.7	2.7	15.4	3.1	17.8	3.5	21.0	3.9	24	4.3	6	7.6	23	23
11	11.8	2.2	13.4	2.6	15.3	3.0	18.8	3.5	22.0	3.9	26.0	4.3	29	4.7	6	7.5	22	29
12	14.4	2.4	16.3	2.9	18.1	3.4	23.0	3.8	27.0	4.3	31.0	4.8	35	5.2	7	7.4	30	25
13	.....	.....	19.3	3.2	21.0	3.7	27.0	4.2	32.0	4.8	36.0	5.3	41	5.8	7	7.3	19	18
14	.....	.....	22.0	3.5	24.0	4.1	31.0	4.7	37.0	5.3	42.0	5.9	48	6.5	7	7.2	25	25
15	.....	.....	25.0	3.9	27.0	4.5	35.0	5.2	43.0	5.9	49.0	6.6	54	7.3	8	7.1	26	23
16	.....	.....	27.0	4.3	30.0	4.9	40.0	5.6	49.0	6.5	56.0	7.5	62	8.5	8	7.0	28	21
17	.....	.....	.....	.....	34.0	5.4	45.0	6.3	55.0	7.3	63.0	8.5	70	9.7	9	6.9	14	14
18	.....	.....	.....	.....	37.0	5.9	51.0	7.0	62.0	8.3	71.0	9.6	78	11.0	9	6.8	14	10
19	.....	.....	.....	.....	.....	.....	56.0	8.1	69.0	9.6	79.0	11.1	87	12.6	10	6.7	9	6
20	.....	.....	.....	.....	.....	.....	62.0	9.5	76.0	11.2	87.0	13.0	96	14.8	10	6.6	6	5
21	.....	.....	.....	.....	.....	.....	69.0	11.6	84.0	13.5	96.0	15.4	105	17.3	11	6.5	7	8
22	.....	.....	.....	.....	.....	.....	75.0	14.8	92.0	16.6	104.0	18.3	115	20.0	12	6.4	8	4
23	.....	.....	.....	.....	.....	.....	81.0	18.1	100.0	20.0	113.0	21.7	125	23.0	12	6.3	4	1
24	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	123.0	25.0	135	27.0	13	6.2	3	___
25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	132.0	29.0	145	31.0	14	6.1	1	___
26	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	142.0	33.0	156	35.0	15	6.0	.....	___
Total	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	286	239

Wexford County.

The "log" volume is the solid contents of wood and bark between a stump height of 1 foot and the "diameter inside bark of top" shown in the fourth from the last column. Volume of "top" is contained in the stem above this point, and in addition all branches suitable for cordwood, having a diameter, outside bark, of 2 inches or more at the middle of a 5-foot stick. The entire volume of trees too small to yield a 6-inch log is considered topwood.

Table 32, U. S. Dept. of Agr. Bul. 285, The Northern Hardwood Forest. E. H. Frothingham. 1915.

Table 28

PAPER BIRCH

(Betula papyrifera)

Ontanagon County, Michigan

Brotherton **1910** Cords

Diameter breast high	Merchantable length—feet				
	10	20	30	40	50
	Volume—cords				
Inches					
6	.02	.04	.05	.07	.08
7	.03	.05	.07	.08	.10
8	.04	.07	.09	.11	.13
9	.05	.08	.11	.13	.16
10	.06	.10	.13	.16	.19
11	.07	.12	.16	.19	.22
12	.08	.14	.19	.22	.26
13		.17	.22	.26	.30
14		.19	.25	.30	.34
15		.22	.29	.34	.38

Volume to 4 inches, including limbs and bark.
Volume obtained from measurements on stacked cords 4x4x8 feet.
Data collected South of Bruce Crossing, 1902.

Table 29

PAPER BIRCH

(*Betula papyrifera*)

Maine and New Hampshire

Dana, S. T. **1909** Cubic feet

Diameter breast high	Total height of tree—feet				
	50	60	70	80	90
	Total volume—cubic feet				
Inches					
4	2.5	3.0			
5	3.7	4.3	4.8		
6	5.2	5.9	6.7	7.8	
7	6.8	7.8	9.0	10.4	12.2
8	8.9	10.2	11.5	13.3	15.3
9	11.2	12.8	14.5	16.5	18.8
10	14.0	15.9	18.0	20.4	22.8
11	17.2	19.5	21.8	24.6	27.5
12	20.0	23.4	26.3	29.5	33.0
13		28.0	31.5	35.3	39.6
14		33.0	37.3	42.1	47.4
15		38.9	44.0	49.7	55.8
16			51.0	57.5	60.0

Volume includes bark.
Table 3, U. S. F. S. Circ. 163. Paper Birch in the Northeast. S. T. Dana. 1909.

Table 30

PAPER BIRCH

(*Betula papyrifera*)

Maine and New Hampshire

R. M. Brown — **1921** — Cubic feet

Diameter breast high	Number of 16-foot logs									Basis
	½	1	1½	2	2½	3	3½	4	4½	
	Merchantable volume—cubic feet									
Inches										*Trees*
4	1	1	2	2	3					9
5	1	2	2	3	4	4				48
6	2	3	3	4	5	6	7			76
7		3	4	5	7	8	9			70
8		4	6	7	8	10	11	13	15	68
9			7	8	10	12	14	16	18	85
10			8	10	12	14	17	19	22	73
11				12	14	17	20	23	26	35
12				13	16	20	23	26	31	32
13					19	22	26	31	35	22
14					22	26	30	35	40	7
15						29	34	39	45	12
16						32	38	44	50	2
17						36	42	48	56	1
18						39	46	54	62	
19							50	59	68	1
20							55	64	75	
Total	1	10	17	35	102	146	165	79	6	561
	Deviation, per cent									Average
Average of individual trees from tabular values		±23.6	±8.4	±10.8	±8.6	±7.4	±7.0	±7.1	±10.1	±8.0
Aggregate for height class		−19.9	−.2	−2.5	−2.1	−1.6	+1.3	+3.2	+7.3	+ .8

Stump height for trees 12 inches in diameter breast high and over equals 1 foot; below 12 inches diameter breast high, stump height equals diameter. Top diameter 3 inches. Cubed in 10-foot sections excepting butt log. Smalian formula. Data collected by S. T. Dana, 1907, and on Maine Forest Survey 1902-3. Values outside of observed data obtained by extending straight lines on logarithmic cross-section paper. Seedlings and sprouts combined after comparison of form quotients. Block indicates extent of observed data.

Table 17, U. S. Dept. of Agr. Bul. Volume Tables for the Important Timber Trees of the United States. Part III.

Table 31

YELLOW BIRCH

(*Betula lutea*)

Michigan, Wisconsin

Frothingham
Barrows **1912** Scribner Decimal C

Diameter breast high	Number of 16-foot logs					Diameter inside bark of top	Basis
	1½	2	2½	3	3½		
	Volume—board feet, in tens						
Inches						*Inches*	*Trees*
8	2.3	3.7				6	11
9	3.0	4.5				6	17
10	3.6	5.4	7.2	9.2		6	26
11	4.3	6.3	8.4	10.		6	17
12	5.0	7.3	9.7	12.		7	27
13	5.7	8.3	11.	14.	17.	7	20
14	6.5	9.4	13.	16.	19.	7	16
15	7.3	11.	14.	18.	21.	8	8
16	8.2	12.	16.	20.	24.	8	16
17		14.	18.	23.	27.	9	15
18		16.	21.	26.	30.	9	15
19		18.	23.	29.	34.	10	13
20		20.	27.	33.	38.	10	9
21		23.	30.	37.	43.	11	6
22		26.	34.	41.	49.	12	3
23		29.	38.	46.	55.	12	5
24		33.	43.	51.	61.	13	4
25		36.	47.	57.	68.	14	4
26		40.	52.	63.	75.	15	2
27		44.	57.	69.	83.	15	
28		48.	62.	76.	90.	16	1
29		52.	67.	83.	98.	17	2
30		56.	72.	90.	105.	17	
Basis							237

Gogebic and Wexford Counties, Mich.; Marinette and Vilas Counties, Wis.
Scaled from taper curves; mostly in 16.3-foot logs, with a few shorter logs where necessary. Stump height, 1 foot. Average utilization.
Table 15, U. S. Dept. of Agr. Bul. 285. The Northern Hardwood Forest. E. H. Frothingham. 1915.

Table 32

YELLOW BIRCH

(*Betula lutea*)

Michigan, Wisconsin

Frothingham
Barrows

1912

Cords

Diameter breast high	Total height of tree—feet					Basis
	50	60	70	80	90	
	Volume—cords					
Inches						*Trees*
6	.035	.039	.043			4
7	.085	.091	.099	.103		12
8	.128	.136	.148	.157	.169	11
9	.164	.175	.193	.209	.229	17
10	.204	.219	.244	.267	.292	26
11	.249	.267	.301	.331	.363	17
12	.296	.323	.364	.400	.439	27
13	.347	.384	.433	.476	.520	20
14	.399	.451	.512	.561	.609	16
15		.528	.599	.653	.703	8
16		.613	.692	.751	.800	16
17		.711	.791	.853	.908	15
18		.815	.896	.961	1.019	15
19		.925	1.004	1.075	1.136	13
20		1.041	1.117	1.189	1.257	9
21			1.231	1.309	1.387	6
22			1.351	1.439	1.523	3
23			1.473	1.571	1.664	5
24			1.603	1.711	1.815	4
25			1.748	1.871	1.987	4
26			1.883	2.016	2.144	2
27			2.031	2.176	2.317	
28			2.181	2.340	2.488	1
29			2.333	2.504	2.661	2
30			2.487	2.667	2.837	
Total						253

Gogebic and Wexford Counties, Mich.; Marinette and Vilas Counties, Wis.
Compiled from Table 33 by a converting factor of 75 cubic feet to the cord.
Table 23, U. S. Dept. of Agr. Bul. Volume Tables for the Important Timber Trees of the United States. Part III.

Table 33

YELLOW BIRCH

(Betula lutea)

Michigan, Wisconsin

Frothingham
Barrows

1912

Cubic feet

Diameter breast high	Total height of tree—feet						Diameter inside bark of top	Basis trees	
	40	50	60	70	80	90		Logs	Tops
	Volume including bark—cubic feet								
Inches							*Inches*		
4	0.8	0.9							
5	1.1	1.3	1.4						6
6	1.4	2.6	2.9	3.2				4	4
7	1.7	6.4	6.8	7.4	7.7			12	12
8	1.9	9.6	10.2	11.1	11.8	12.7	6	11	11
9		12.3	13.1	14.5	15.7	17.2	6	17	17
10		15.3	16.4	18.3	20.0	22.0	6	26	26
11		19	20	23	25	28	6	17	17
12		22	24	27	30	33	7	27	27
13		26	29	33	36	39	7	20	20
14		30	34	38	42	46	7	16	17
15			40	45	49	53	8	8	8
16			46	51	56	60	8	16	14
17			54	59	64	68	9	15	15
18			61	68	72	76	9	15	15
19			69	75	80	85	10	13	12
20			78	84	89	94	10	9	7
21				92	98	104	11	6	5
22				102	108	115	12	3	2
23				110	118	125	12	5	5
24				120	128	136	13	4	4
25				131	140	149	14	4	4
26				141	151	161	15	2	2
27				152	163	174	15		
28				164	175	187	16	1	1
29				175	188	200	17	2	2
30				186	200	213	17		
Total								253	253

Gogebic and Wexford Counties, Mich.; Marinette and Vilas Counties, Wis.

Height includes both logs and top. The "log" volume is the solid contents of wood and bark between a stump height of 1 foot and the "diameter inside bark of top" shown in the eighth column. The volume of "top" is that contained in the stem above this point and in addition all branches suitable for cordwood having a diameter, outside bark, of 2 inches or more at the middle of a 5-foot stick. The entire volume of trees too small to yield a 6-inch log is considered topwood. Bark comprises about 13 per cent of total volume.

Table 31, U. S. Dept. of Agr. Bul. 285. The Northern Hardwood Forest. E. H. Forthingham. 1915.

Table 34

NORTHERN WHITE CEDAR

(Thuja occidentalis)

Ontanagon County, Michigan

Brotherton — **1910** — Scribner

Diameter breast high	Number of 16-foot logs			
	1	2	3	4
	Volume—board feet			
Inches				
10	20	40		
12	30	50		
14	50	100	120	
16	80	140	170	
18	110	170	220	
20	160	240	320	
22	210	330	410	
24	280	440	530	580

Top diameter inside of bark, 8 inches.
Basis, approximately 100 trees in each D. B. H. class.
Data collected South of Bruce Crossing, 1902.

Table 35

NORTHERN WHITE CEDAR

(Thuja occidentalis)

New York

Belyea — **1922** — Cubic feet

Diameter breast high	Total height of tree—feet						
	20	30	40	50	60	70	80
	Total volume—cubic feet						
Inches							
5	0.51	1.02	1.44	1.90			
6	1.75	2.31	2.79	3.70			
7	2.65	3.42	4.43	5.65			
8	4.17	4.89	6.02	7.50			
9	5.16	6.20	7.54	9.23	10.35		
10		7.92	9.27	11.00	12.90	15.10	
11			11.57	13.31	15.29	17.55	20.05
12			13.91	15.90	18.00	20.27	23.00
13			16.30	18.35	20.45	23.30	26.39
14			18.72	20.85	23.30	25.95	29.70
15			21.45	24.25	26.70	29.65	32.80
16				27.10	29.95	33.30	36.80
17				30.65	33.50	36.65	40.35
18				33.35	36.90	40.60	44.50
19				36.60	40.75	44.55	47.85
20				41.05	44.55	48.25	51.95

Based on 221 trees collected in St. Lawrence Co., N. Y.
Table 65, N. Y. State College of Forestry. Bul. 14, H. C. Belyea, O. M. Porter.

Table 36

NORTHERN WHITE CEDAR

(*Thuja occidentalis*)

New York

Belyea | **1922** | Cubic feet

Diameter breast high	Total height—feet						
	20	30	40	50	60	70	80
	Volume—cubic feet						
Inches							
5	0.40	0.78	1.10	1.45			
6	1.38	1.82	2.20	2.92			
7	2.15	2.78	3.60	4.60			
8	3.50	4.10	5.05	6.30			
9	4.45	5.35	6.50	7.95	9.80		
10		7.00	8.20	9.75	11.40	13.35	
11			10.40	12.00	13.75	15.80	18.10
12			12.65	14.45	16.35	18.40	20.90
13			15.00	16.90	18.80	21.45	24.30
14			17.50	19.50	21.75	24.20	27.80
15			20.25	22.90	25.20	28.00	30.95
16				25.80	28.50	31.75	35.00
17				29.20	31.95	34.95	38.55
18				32.00	35.41	39.15	42.70
19				35.52	39.45	43.25	46.45
20				40.00	43.50	47.00	50.50

Based on 221 trees collected in St. Lawrence Co., N. Y.
Utilization to 4-inch top inside bark and 1-foot stump.
Table 66. N. Y., State College of Forestry, Bul. 14, H. C. Belyea, O. M. Porter.

Table 37

SECOND-GROWTH COTTONWOOD.

(Populus deltoides)

Mississippi Valley

Williamson
Homans

1912

Scribner Decimal C

Diameter breast high	Total height of tree—feet										Diameter inside bark of top	Basis
	90	100	110	120	130	140	150	160	170	180		
	Volume—board feet, in tens											
Inches											*Inches*	*Trees*
12	1	2	3	4	.....	.....	.....	.....	.....	.....	11	.....
13	4	5	6	7	.....	.....	.....	.....	.....	.....	12	.....
14	6	7	8	9	.....	.....	.....	.....	.....	.....	12	20
15	9	11	12	13	.....	.....	.....	.....	.....	.....	12	.....
16	12	14	15	17	19	.....	.....	.....	.....	.....	12	30
17	15	18	20	22	24	.....	.....	.....	.....	.....	13	.....
18	19	22	25	27	30	33	.....	.....	.....	.....	13	32
19	23	26	30	33	37	40	.....	.....	.....	.....	13	.....
20	26	31	35	39	43	47	51	.....	.....	.....	13	33
21	30	36	40	45	50	55	59	.....	.....	.....	14	.....
22	34	41	46	52	57	62	66	70	.....	.....	14	32
23	39	46	52	58	64	69	74	78	.....	.....	15	.....
24	43	51	58	65	71	77	82	86	91	.....	15	34
25	.....	57	64	71	78	84	90	94	98	.....	15	.....
26	.....	63	71	78	85	92	97	102	106	.....	16	50
27	.....	69	77	85	92	99	105	110	115	.....	16	.....
28	.....	75	84	92	100	107	113	118	123	.....	17	47
29	.....	81	90	99	108	115	121	127	132	.....	17	.....
30	.....	87	96	106	115	123	130	135	141	147	18	40
31	.....	.....	102	112	122	131	138	145	150	156	18	.....
32	.....	.....	108	119	129	139	147	154	160	166	19	28
33	.....	.....	114	126	137	148	156	163	170	176	19	.....
34	.....	.....	120	133	144	156	165	172	180	186	20	33
35	.....	.....	125	140	152	164	174	182	189	196	20	.....
36	.....	.....	131	147	159	172	182	191	200	207	21	30
37	.....	.....	.....	153	166	180	191	201	210	218	22	.....
38	.....	.....	.....	160	173	188	200	211	221	229	22	24
39	.....	.....	.....	167	180	196	208	221	231	240	23	.....
40	.....	.....	.....	173	187	204	217	231	241	251	24	20
41	.....	.....	.....	.....	194	211	225	240	250	262	25	.....
42	.....	.....	.....	.....	201	218	234	249	260	273	25	17
43	.....	.....	.....	.....	208	226	242	258	270	284	26	.....
44	.....	.....	.....	.....	215	233	250	266	280	294	27	5
45	.....	.....	.....	.....	222	241	259	275	290	305	28	.....
46	.....	.....	.....	.....	229	248	267	284	300	315	28	5
47	.....	.....	.....	.....	236	256	276	293	310	326	29	.....
48	.....	.....	.....	.....	243	263	284	302	319	336	30	.....
49	.....	.....	.....	.....	250	270	292	311	329	347	31	.....
50	.....	.....	.....	.....	256	278	301	320	338	357	32	.....
Total	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	480

Height of stump, 2 feet for trees less than 36 inches in diameter breast high; 2.5 feet for trees 36 inches and over. Trees from Arkansas, Missouri, Kentucky, Mississippi, Tennessee, Louisiana.

Table 12, U. S. Dept. of Agr. Bul. Volume Tables for the Important Timber Trees of the United States. Part III.

Table 38

SECOND-GROWTH COTTONWOOD

(Populus deltoides)

Mississippi Valley

Williamson
Homans — 1912 — Scribner Decimal C

Diameter breast high	Number of 16-foot logs						Diameter inside bark of top	Basis
	1	2	3	4	5	6		
	Volume—board feet, in tens							
Inches							*Inches*	*Trees*
14	8	17					12	21
15	9	18					12	
16	10	19					12	30
17	11	21					13	
18	12	23	30				13	32
19	14	25	34				13	
20	16	28	38	46			13	33
21	18	31	43	53			14	
22	20	35	48	61	72		14	32
23	23	39	54	68	80		15	
24	26	44	60	75	88		15	34
25		48	66	82	96		15	
26		54	72	89	104	115	16	50
27		59	79	97	113	124	16	
28		64	86	105	121	134	17	47
29		70	93	113	130	144	17	
30		76	100	122	139	156	18	40
31		82	107	130	149	167	18	
32		88	114	140	160	170	19	28
33			121	149	171	192	19	
34			129	158	182	205	20	31
35			136	167	194	219	20	
36			144	177	205	233	21	30
37			152	186	217	247	22	
38			160	195	229	261	22	24
39			168	205	241	275	23	
40			176	215	253	289	24	20
41			184	225	265	303	25	
42			193	235	276	317	25	16
43			201	245	288	331	26	
44			210	255	300	346	27	5
45				266	313	361	28	
46				276	325	376	28	5
47				287	337	392	29	
48				297	350	407	30	
49				307	362	423	31	
50				319	374	439	32	
Total								478

Height of stump, 2 feet for trees less than 36 inches in diameter breast high; 2.5 feet for trees 36 inches and over. Trees from Arkansas, Kentucky, Louisiana, Missouri, Mississippi, Tennessee.

Table 11, U. S. Dept. of Agr. Bul. Volume Tables for the Important Timber Trees of the United States. Part III.

Table 39

SECOND-GROWTH COTTONWOOD

(Populus deltoides)

Mississippi Valley

Homans
Williamson **1910** Cubic feet

Diameter breast high	Total height of tree—feet											Basis
	50	60	70	80	90	100	110	120	130	140	150	
	Peeled volume—cubic feet											
Inches												*Trees*
5	2.5	3.0	3.5									16
6	3.5	4.5	5.0	6.0								26
7	5.0	6.0	6.5	7.5	8.5							22
8	6.5	7.5	8.5	9.5	11.0	12.5						24
9		9.5	10.5	12.0	14.0	16.5	19.5					29
10		11.5	13.0	15.0	17.5	20.5	24.0					21
11		13.5	15.5	18.0	21.0	24.5	28.5	33.0				32
12		16.0	18.5	21.5	25.0	29.0	33.5	38.0				20
13			22.5	25.5	29.0	33.5	38.0	43.0				25
14			26.5	29.5	33.5	38.0	43.0	48.5	54.0			25
15				33.5	37.5	42.5	48.5	54.5	60.0			18
16				37.5	42.0	47.5	53.5	60.0	67.0			14
17				41.5	47.0	53.0	59.5	66.5	73.5	80.5		19
18					52.0	58.5	65.5	73.0	80.5	89.0		13
19					56.5	64.5	72.5	80.5	89.0	97.5		19
20					62.0	71.0	79.5	88.5	97.5	107.5		9
21						78.5	88.0	97.5	107.5	118.5	129.0	8
22						86.5	97.0	107.5	118.5	130.0	142.5	7
23						95.5	107.0	118.5	130.0	142.5	156.0	6
24							118.5	130.5	142.5	156.0	170.0	9
25							131.0	143.0	156.0	169.0	183.0	9
26								156.0	169.0	183.0	197.0	10
27								168.5	182.0	196.0	211.5	9
28									194.5	210.0	225.5	2
29									208.0	223.5	239.5	10
30									221.5	238.0	254.5	7
Basis	20	36	26	41	54	55	64	35	30	33	15	409

Trees from Arkansas, Kentucky, Tennessee, Missouri, Mississippi, and Louisiana. Table 14, U. S. Dept. of Agr. Bul. Volume Tables for the Important Timber Trees of the United States. Part III.

Table 40

ELM

(Ulmus americana)

Ontanagon County, Michigan

Brotherton **1910** Scribner

Diameter breast high	Number of 16-foot logs						
	1	1½	2	2½	3	3½	4
	Volume—board feet						
Inches							
10	30	40	50	75	90		
12	55	80	105	125	140		
14	80	130	145	165	185		
16	115	160	185	220	260	300	330
18	160	205	250	300	350	375	400
20	210	280	360	415	475	510	590
22	250	375	450	525	620	700	750
24	305	475	525	600	710	760	800
26	375	550	625	745	790	920	975
28	460	730	835	880	960	1100	1200
30	550	820	910	1050	1150	1245	1460
32	580	1000	1160	1270	1480	1700	1815
34	655	1100	1340	1500	1640	1675	1705
36	735	1200	1405	1675	1925	2000	2080

Stump height, approximately 2.5 feet; top diameter, 8 inches inside bark. Basis; approximately 100 trees for each D. B. H. class. Data collected South of Bruce Crossing, 1902.

Table 41

MIXED HARDWOODS

Southern Michigan

Chittenden, A. K. **1923**

Diameter breast high	Volume
Inches	*Cubic feet*
2	0.4
3	0.8
4	1.5
5	3.0
6	4.6
7	7.0
8	9.5
9	12.6
10	16.2
11	20.5
12	25.0
13	30.5
14	36.0
15	42.0
16	48.0
17	55.0
18	62.0
19	70.0
20	79.5
21	88.0
22	99.0
23	110.0
24	122.5
25	135.0

Volume includes cordwood in tops and branches.

Table II. Special Bul. 122, Improvement of the Farm Woodlot. Mich. Agr. College.

Table 42

EASTERN HEMLOCK

(Tsuga canadensis)

Michigan, Wisconsin

Frothingham Barrows — **1912** — Scribner Decimal C

Diameter breast high	Total height of tree—feet: 30	40	50	60	70	80	90	100	Diameter inside bark of top	Basis
	Volume—board feet, in tens									
Inches									*Inches*	*Trees*
8	0.5	0.7	1.3	2.0	2.5	3			6	53
9	0.8	1.4	2.2	2.9	3.5	4			6	72
10	1.2	2.2	3.2	4.0	4.7	5			6	56
11	1.6	2.9	4.2	5.1	6.0	7	8		6	53
12	2.0	3.7	5.3	6.4	7.6	8	9		7	46
13	2.5	4.6	6.5	7.8	9.4	10	11		7	35
14	3.0	5.6	7.7	9.5	11	13	14		7	18
15	3.6	6.5	9	11	13	15	16		8	31
16	4.1	7.6	11	13	16	18	19	20	8	25
17		8.7	12	15	18	21	22	24	8	30
18		10.0	14	18	21	24	26	28	8	14
19			16	20	24	28	30	32	9	16
20			18	23	28	31	34	36	9	20
21			20	26	31	35	38	41	9	11
22			22	29	35	39	43	47	10	13
23				33	38	44	48	52	10	4
24				36	42	49	54	58	10	6
25				39	46	53	60	65	10	9
26				43	51	58	66	72	11	4
27				47	55	64	72	79	11	8
28				50	59	69	78	87	11	6
29				54	64	75	85	94	11	3
30				57	68	80	92	103	12	1
31					72	86	99	111	12	2
32					76	93	107	120	12	1
33					81	99	114	129	12	3
34					85	105	122	138	13	1
35						112	130	148	13	1
36						118	138	157	13	
37							147	167	13	
38							155	178	14	
Total										542

Gogebic County, Mich.; Marinette and Vilas Counties, Wis.
Scaled from taper curves, mostly in 16.3-foot logs, with a few shorter logs. Stump height 2 feet.
Table 12, U. S. Dept. of Agr. Bul. 152. The Eastern Hemlock. 1913.

Table 43

EASTERN HEMLOCK

(*Tsuga canadensis*)

Michigan, Wisconsin

Frothingham
Barrows **1912** Scribner Decimal C

Diameter breast high	Number of 16-foot logs									Diameter inside bark of top	Basis
	1	1½	2	2½	3	3½	4	4½	5		
	Volume—board feet, in tens										
Inches										*Inches*	*Trees*
8	1.8	2.8	3.8							6	53
9	1.9	3.0	4.2							6	72
10	2.0	3.2	4.7	6						6	56
11	2.3	3.9	5.7	7						6	53
12	2.5	4.5	6.6	8	11					7	46
13	2.6	5.3	7.9	10	13					7	35
14	2.8	6.3	9.2	12	14	17				7	18
15	3.0	7.2	11.0	13	17	20				8	31
16	3.2	8.2	12	15	19	22				8	25
17	3.4	9.4	14	18	21	25				8	30
18	3.6	11.0	16	20	24	28	32			8	14
19	3.8	12.0	18	22	27	31	35			9	16
20	4.0	13.0	20	25	29	34	39			9	20
21		15.0	23	28	33	38	43			9	11
22		17.0	26	31	36	42	48	53		10	13
23			28	34	40	46	53	60		10	4
24			31	37	44	51	58	66		10	6
25			33	40	48	56	64	73		10	9
26			36	43	52	60	70	81	92	11	4
27				47	56	66	77	88	100	11	8
28				50	60	71	83	96	109	11	6
29				53	64	76	90	104	118	11	3
30				56	68	82	96	111	127	12	1
31					72	88	104	120	137	12	2
32					77	93	111	128	146	12	1
33					82	99	118	137	156	12	3
34					87	105	125	145	167	13	1
35						114	134	155	176	13	1
36						121	142	164	187	13	
37						127	150	173	197	13	
38						133	158	183	208	14	
Total											542

Gogebic County, Mich.; Marinette and Vilas Counties, Wis.

Scaled from taper curves, mostly in 16.3-foot logs, with a few shorter logs where necessary. Stump height, 2 feet.

Table 90, U. S. Dept. of Agr. Bul. Volume Tables for the Important Timber Trees of the United States. Part II.

Table 44

EASTERN HEMLOCK

(Tsuga canadensis)

New York

Belyea 1919 Cords

Diameter breast high	Total height of tree—feet						
	40	50	60	70	80	90	100
	Merchantable volume—cords*						
Inches							
6	.06	.07					
7	.07	.09					
8	.09	.11	.13				
9	.12	.14	.17				
10	.14	.17	.20	.24			
11	.16	.20	.24	.28	.34		
12	.20	.24	.28	.34	.38		
13	.24	.28	.34	.38	.44		
14		.34	.38	.44	.51	.58	
15		.38	.43	.50	.57	.66	
16		.42	.48	.56	.64	.73	.82
17		.46	.56	.62	.71	.80	.90
18		.51	.61	.70	.80	.92	1.04
19			.67	.78	.89	1.04	1.19
20			.73	.85	.99	1.17	1.34
21			.80	.93	1.10	1.29	1.51
22				1.01	1.23	1.44	1.67
23				1.10	1.36	1.60	1.86
24				1.20	1.49	1.77	2.05
25				1.31	1.64	1.95	2.24
26				1.45	1.79	2.16	2.43
27					1.92	2.34	2.62
28					2.00	2.54	2.83
29					2.17	2.74	3.05
30					2.35	2.94	3.27

*Converted on the basis of 90 cubic feet of mixed diameters to the solid cord.
Based on 950 trees collected in St. Lawrence Co., N. Y.
Table 51, N. Y. State College of Forestry Bul. 14, H. C. Belyea, O. M. Porter.

Table 45

EASTERN HEMLOCK

(Tsuga canadensis)

Michigan, Wisconsin

Frothingham
Barrows

1912

Cubic feet

Diameter breast high	Total height of tree—feet								Basis
	30	40	50	60	70	80	90	100	
	Unpeeled volume—cubic feet								
Inches									*Trees*
5	1.0	1.2	1.7						18
6	2.0	2.6	3.3						16
7	3.1	4.1	5.2	5.9					28
8	4.1	5.5	7.3	8.4					53
9	5.4	7.4	9.3	10.9	12.3				72
10	7.0	9.5	11.9	14.1	15.7				56
11	8.6	11.8	14.6	17.2	19.6	22			53
12	10.6	14.4	18.0	21.0	24.0	26			46
13	12.5	17.0	21.0	24.0	28.0	31	33		35
14	14.8	20.0	24.0	28.0	33.0	37	39		18
15	17.0	23.0	28.0	33.0	38.0	42	45		31
16	19.3	26.0	32.0	38.0	44.0	48	51	54	25
17			36.0	43.0	50.0	54	59	62	30
18			41.0	48.0	56.0	61	67	71	14
19			45.0	54.0	62.0	69	75	79	16
20			50.0	60.0	69.0	77	83	87	20
21				66.0	76.0	85	91	98	11
22				72.0	83.0	93	100	109	13
23				79.0	91.0	102	109	119	4
24				85.0	99.0	111	119	129	6
25					107.0	120	131	143	9
26					116.0	130	144	156	4
27					123.0	139	155	169	8
28					131.0	147	167	182	6
29						157	179	195	3
30						169	191	208	1
31						180	204	222	2
32						192	218	237	1
33							231	252	3
34							246	267	1
35							260	283	1
36							275	299	
Total									604

Gogebic County, Mich.; Marinette and Vilas Counties, Wis.

Based on taper curves. Volume includes stem with bark between a 2-foot stump and a 4-inch top. Bark forms 19 per cent of the total volume of the stem.

Table 17, U. S. Dept. of Agr. Bul. 152, The Eastern Hemlock. 1913.

Table 46

HICKORY

(*Hicoria* sp.)

Mississippi and Ohio Valleys, Appalachians

Boisen **1909** Cubic feet

Diameter breast high	Total height—feet						Used volume
	40	50	60	70	80	90	
	Total volume—cubic feet						
Inches							*Per cent*
5	2.1	3.1	4.3	6.0			40
6	3.3	4.5	5.9	7.8			41
7	4.7	6.2	7.9	9.9	12.6		42
8	6.4	8.2	10.1	12.5	15.5	18.7	44
9	8.2	10.4	12.8	15.5	18.8	22.5	45
10	10.4	13.0	15.8	19.0	22.6	26.7	47
11	12.8	15.9	19.3	23.0	27.0	31.5	49
12	15.6	19.0	23.2	27.4	31.9	36.8	50
13		22.6	27.5	32.1	37.2	42.8	52
14			32.0	37.2	43.0	49.2	53
15			36.8	42.6	49.1	55.8	53
16				48.4	55.5	62.8	54
17				54.5	62.5	70.4	54
18				60.8	69.8	78.8	54

Basis, 365 trees of 5 species cut for staves and bolts. Volume includes tops and larger branchwood.

Table 7, U. S. Forest Service Bul. 80, The Commercial Hickories. 1910.

Table 47

HICKORY

(*Hicoria sp.*)

Mississippi and Ohio Valleys, Appalachians

Boisen 1909 Cubic feet

Diameter breast high	Merchantable length—feet													Diameter inside bark of top	Basis
	5	10	15	20	25	30	35	40	45	50	55	60	65		
	Volume—cubic feet														
Inches														*Inches*	*Trees*
5	1.0	1.8	2.3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	5
6	1.3	2.5	3.2	3.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	5	19
7	1.6	3.2	4.2	5.0	5.7	.....	.....	.....	.....	.....	.....	.....	.....	6	26
8	2.0	4.0	5.4	6.5	7.5	.....	.....	.....	.....	.....	.....	.....	.....	6	43
9	2.5	4.8	6.6	8.2	9.6	10.0	.....	.....	.....	.....	.....	.....	.....	7	56
10	3.0	5.8	8.1	10.0	11.5	13.0	.....	.....	.....	.....	.....	.....	.....	8	53
11	3.5	6.9	9.7	12.0	14.0	16.0	18.0	.....	.....	.....	.....	.....	.....	8	55
12	4.1	8.0	11.5	14.5	17.0	20.0	21.5	23.5	.....	.....	.....	.....	.....	9	30
13	4.8	9.3	13.5	17.0	20.5	23.5	26.0	28.5	31	.....	.....	.....	.....	10	36
14	5.5	10.5	15.5	20.0	24.0	27.5	31.0	34.0	37	.....	.....	.....	.....	11	36
15	6.2	12.0	17.5	23.0	27.5	32.0	36.0	39.0	43	.....	.....	.....	.....	11	29
16	7.0	14.0	20.0	26.5	31.0	36.0	41.0	45.0	50	54	.....	.....	.....	12	24
17	8.0	15.5	23.0	29.5	36.0	41.0	46.0	51.0	56	61	66	.....	.....	13	23
18	.....	17.5	25.5	33.0	40.0	46.0	52.0	58.0	63	69	74	.....	.....	14	17
19	.....	19.5	28.5	37.0	45.0	52.0	58.0	64.0	70	76	82	.....	.....	14	23
20	.....	21.5	32.0	41.0	50.0	57.0	64.0	71.0	78	84	90	97	103	15	22
21	.....	24.0	35.0	45.0	54.0	63.0	71.0	79.0	86	93	100	107	113	16	19
22	.....	26.0	38.0	50.0	60.0	69.0	77.0	86.0	94	102	110	118	126	16	20
23	.....	28.5	42.0	54.0	65.0	75.0	84.0	93.0	102	111	120	128	137	17	25
24	.....	31.0	45.0	59.0	70.0	81.0	91.0	102.0	111	121	130	139	148	18	16
25	.....	34.0	49.0	64.0	76.0	88.0	99.0	110.0	121	130	140	149	158	19	10
26	.....	36.5	53.0	69.0	82.0	95.0	107.0	119.0	130	140	151	161	171	19	12
27	.....	.....	57.0	74.0	89.0	103.0	116.0	128.0	140	151	162	173	183	20	8
28	.....	.....	61.0	80.0	97.0	112.0	125.0	137.0	149	161	173	185	197	20	3
Basis	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	610

Data for five species of hickory.
Table 8, U. S. Forest Service Bul. 80, The Commercial Hickories. 1910.

Table 48

RED MAPLE

(Acer rubrum)

Massachusetts

E. E. Carter — **1913** — **Cords**

Diameter breast high	Total height of tree—feet							Basis
	20	30	40	50	60	70	80	
	Merchantable volume—cords							
Inches								*Trees*
3	.009	.011	.015	.018				51
4	.015	.019	.024	.029				36
5		.031	.034	.043	.051			38
6			.048	.060	.072	.081		42
7			.063	.079	.095	.113		25
8			.078	.101	.122	.140	.153	39
9			.095	.125	.149	.168	.184	28
10				.151	.179	.199	.217	20
11				.179	.212	.235	.252	23
12				.210	.251	.276	.294	10
13				.246	.292	.324	.343	9
14				.286	.338	.374	.392	8
15				.332	.390	.430	.450	3
16				.383	.451	.491	.565	4
17							.607	2
Basis								338

[1] A standard cord is a pile 8 feet long by 4 feet high and 4 feet broad. Contractors usually require about 3 inches additional height to allow for settling. Where wood is intended for distillation a length of 50 inches is commonly specified. This influences the converting factor but little, compared with the other variables.

[2] See A Volume Table for Red Maple on the Harvard Forest, by E. E. Carter; Bul. of the Harvard Forestry Club, Vol. II, 1913, pp. 1-8.

Table 49

RED MAPLE

(*Acer rubrum*)

Massachusetts

E. E. Carter — **1913** — Cubic feet

Diameter breast high	Total height of tree—feet							Basis
	20	30	40	50	60	70	80	
	Merchantable volume, including bark—cubic feet							
Inches								*Trees*
2	0.25	0.35	0.55					59
3	0.60	0.71	1.00	1.2				51
4	1.00	1.30	1.65	2.0				36
5		2.15	2.40	3.0	3.6			38
6			3.45	4.3	5.2	6.2		42
7			4.70	5.9	7.1	8.4		25
8			6.05	7.8	9.4	10.8	11.8	39
9			7.65	10.1	12.0	13.5	14.8	28
10				12.7	15.0	16.7	18.2	20
11				15.6	18.5	20.5	22.0	23
12				18.9	22.5	24.8	26.4	10
13				22.6	26.8	29.7	31.4	9
14				26.8	31.6	35.0	36.7	8
15				31.5	37.0	40.7	42.7	3
16				36.6	43.2	47.0	49.7	4
17							58.4	2
Basis								397

The volumes are for stem and branch wood to a minimum diameter, outside bark, of about 2 inches at the middle of a 4-foot length. The measurements were taken in a wide variety of types, including bottom or swale, pine slope, swamp, and birch and maple coppice. Most of the trees more than 6 inches in diameter breast-high were of seedling origin.

[1]See A Volume Table for Red Maple on the Harvard Forest, by E. E. Carter; Bulletin of the Harvard Forestry Club, Vol. II, 1913, pp. 1-8.

Table 50

SUGAR MAPLE

(Acer saccharum)

Central Michigan

Chittenden, A. K. **1925** Scribner

Diameter breast high	Merchantable length—feet*						Top diameter	Basis
	24	32	40	48	56	64		
	Volume—board feet							
Inches							*Inches*	*Trees*
10	44	60					8.6	19
11	48	68	80				9.1	20
12	53	76	95	112			9.3	32
13	62	87	113	136			9.7	37
14	75	104	132	161	196		10.1	38
15	93	123	156	189	227		10.4	47
16	114	147	184	220	259	293	10.8	48
17	141	174	215	255	294	335	11.2	63
18	171	205	250	295	336	378	11.7	57
19	203	239	288	336	377	424	12.1	36
20		277	329	380	424	473	12.6	30
21		319	372	425	474	527	13.2	46
22		363	418	473	529	586	13.8	50
23		408	467	525	588	650	14.5	36
24		455	519	583	651	722	15.2	44
25		503	574	644	721	804	16.0	28
26		550	634	712	798	899	16.9	25
27			694	787	879	999	17.8	24
28			756	867	967	1108	18.9	13
29			821	951	1061	1220	20.1	10
30				1040	1159	1335	21.3	8
31				1130	1258	1453	22.6	7
32					1357	1571	23.9	9
Basis								725

*Merchantable length is the length which can be used for logs.

Chittenden, A. K., Mich. State College Agr. Exp. Sta. Quart. Bul. Volume of Sugar Maple Trees. Vol. 7. No. 4. 1925.

Table 51

SUGAR MAPLE

(*Acer saccharum*)

Michigan, Wisconsin

Frothingham
Barrows **1912** Scribner Decimal C

Diameter breast high	Number of 16-foot logs						Diameter inside bark of top	Basis
	1½	2	2½	3	3½	4		
	Volume—board feet, in tens							
Inches							*Inches*	*Trees*
8	2.5	3.1	3.8				6	21
9	3.0	4.0	5.0				6	35
10	3.7	4.7	6.2	7.6	9.4		6	23
11	4.3	5.9	7.6	9.3	11		6	26
12	5.0	7.0	9.1	11	14	17	7	25
13	5.7	8.2	11	13	16	19	7	20
14	6.5	9.5	13	16	19	22	7	22
15	7.3	11	15	18	22	25	8	16
16	8.3	12	17	21	25	29	8	22
17	9.3	14	19	24	28	33	9	7
18	10	16	22	27	32	38	9	13
19		18	24	30	37	43	10	6
20		20	27	34	41	49	10	9
21		22	30	38	46	55	11	7
22		25	34	42	52	62	12	7
23		28	37	47	58	69	12	6
24		31	41	52	64	77	13	2
25		34	46	57	71	84	14	6
26		37	50	63	78	93	15	1
27			55	69	86	102	15	2
28			60	76	94	111	16	
29			65	82	102	121	17	
30			69	89	111	130	17	2
Total								278

Gogebic and Wexford Counties, Mich.; Marinette and Vilas Counties, Wis.
Scaled from taper curves mostly in 16.3-foot logs, with a few shorter logs where necessary. Stump height, 1 foot. Average utilization.
Table 25, U. S. Dept. of Agr. Bul. 285, The Northern Hardwood Forest. 1915.

Table 52

SUGAR MAPLE

(*Acer saccharum*)

Michigan, Wisconsin

Frothingham
Barrows

1912

Cords

Diameter breast high	Total height of tree—feet						Basis
	50	60	70	80	90	100	
	Volume—cords						
Inches							*Trees*
6	.032	.039	.045	.053			9
7	.071	.087	.103	.119			18
8	.113	.132	.151	.169			21
9	.160	.175	.195	.221			35
10	.207	.223	.247	.279	.315		23
11	.257	.273	.304	.343	.387		26
12	.312	.329	.365	.413	.465	.523	25
13		.391	.432	.489	.552	.621	20
14		.456	.505	.572	.644	.727	22
15		.529	.580	.660	.744	.840	16
16		.608	.663	.755	.853	.960	22
17			.747	.855	.968	1.087	7
18			.836	.964	1.091	1.221	13
19			.932	1.079	1.220	1.360	6
20			1.033	1.197	1.352	1.507	9
21			1.140	1.324	1.497	1.660	7
22			1.255	1.456	1.644	1.823	7
23			1.377	1.599	1.803	1.997	6
24			1.505	1.748	1.981	2.189	2
25				1.909	2.171	2.408	6
26				2.104	2.379	2.661	1
27				2.288	2.592	2.907	2
28				2.484	2.811	3.149	
29				2.692	3.045	3.400	
30				2.885	3.269	3.656	2
Basis							305

Data collected in Gogebic and Wexford Counties, Mich.; Marinette and Vilas Counties, Wis.

Volume includes wood and bark of stem above a 1-foot stump, and in addition all branches suitable for cordwood having a diameter, outside of bark, of 2 inches or more at the middle of a 5-foot stick.

Standard cords 4x4x8 feet; 75 cubic feet per cord.

Table 53

SUGAR MAPLE

(*Acer saccharum*)

Michigan and Wisconsin

Frothingham **1912** **Cubic feet**

Diameter breast high	Total height of tree—feet												Diameter inside bark of top	Basis (trees)	
	50		60		70		80		90		100				
	Volume, including bark—cubic feet														
	Logs	Top	Logs	Top	Logs	Top	Logs	Top	Logs	Top	Logs	Top		Logs	Tops
Inches													*Inches*		
6	0.6	1.8	0.7	2.2	0.8	2.6	1.0	3.0						9	10
7	3.4	1.9	4.2	2.3	5.0	2.7	5.7	3.2						18	17
8	6.5	2.0	7.4	2.5	8.4	2.9	9.4	3.3					6	21	22
9	9.8	2.2	10.4	2.7	11.6	3.0	13.1	3.5					6	35	34
10	13.1	2.4	13.8	2.9	15.2	3.3	17.2	3.7	19.4	4.2			6	23	24
11	16.7	2.6	17.4	3.1	19.3	3.5	22.	4.0	25.	4.5			6	26	26
12	21.0	2.8	21.	3.4	24.	3.8	27.	4.4	30.	4.9	34	5.4	7	25	25
13			26.	3.7	28.	4.2	32.	4.8	36.	5.4	41	6.0	7	20	20
14			30.	4.1	33.	4.8	37.	5.4	42.	6.0	48	6.7	7	22	22
15			35.	4.7	38.	5.4	43.	6.1	49.	6.8	55	7.5	8	16	16
16			40.	5.4	43.	6.3	50.	7.0	56.	7.8	64	8.5	8	22	22
17					49.	7.2	56.	8.0	64.	8.9	72	9.6	9	7	7
18					54.	8.4	63.	9.4	72.	10.2	81	11.0	9	13	13
19					60.	9.8	70.	11.0	80.	11.8	89	12.6	10	6	5
20					66.	11.5	77.	12.7	88.	13.5	99	14.4	10	9	8
21					72.	13.4	85.	14.6	97.	15.5	108	16.5	11	7	6
22					79.	15.6	92.	16.9	105.	17.8	118	19.	12	7	7
23					85.	18.3	100.	20.	114.	21.	128	22.	12	6	6
24					92.	21.0	108.	23.	124.	25.	138	26.	13	2	2
25							116.	27.	133.	30.	149	32.	14	6	6
26							125.	33.	142.	36.	160	40.	15	1	1
27							134.	38.	152.	42.	171	47.	15	2	
28							142.	44.	163.	48.	182	54.	16		
29							152.	50.	173.	55.	194	61.	17		
30							161.	55.	184.	61.	206	68.	17	2	
Total														305	299

The "log" volume is the solid contents of wood and bark between a stump height of 1 foot and the "diameter inside bark of top." The volume of "top" is that contained in the stem above this point, and in addition all branches suitable for cordwood having a diameter, outside bark, of 2 inches or more at the middle of a 5-foot stick. The entire volume of trees too small to yield a 6-inch log is considered top wood. Bark comprises about 17 per cent of the total volume; there was no consistent variation with the size of the tree. Trees from Gogebic and Wexford Counties, Mich., and Marinette and Vilas Counties, Wis.

Table 35, U. S. Dept. of Agr. Bul. 285, The Northern Hardwood Forest. 1915.

Table 54

RED, BLACK AND SCARLET OAK

(Quercus sp.)

New York and Connecticut

Frothingham
Barrows

1912

Cubic feet

Diameter breast high	Total height of tree—feet							Basis
	20	30	40	50	60	70	80	
	Volume—cubic feet							
Inches								*Trees*
2	0.3	0.4						26
3		0.9	1.0					55
4		1.5	2.0	2.6				54
5		2.4	2.9	3.6				46
6			4.2	5.0	6.0			38
7			5.7	6.6	7.6	8.9		36
8			7.0	8.5	10.2	12.0		11
9			8.7	10.9	13.0	15.2	17.3	16
10			10.5	13.1	15.7	18.4	21.0	24
11			13.0	16.0	19.0	22.1	25.2	35
12			16.4	19.7	22.8	26.2	29.3	33
13			21.0	24.3	27.7	31.0	34.3	30
14			25.3	39.0	32.6	36.3	40.0	13
15			30.2	34.2	38.1	42.0	45.8	12
16				40.0	44.1	48.2	52.4	5
17						54.6	59.1	4
18						61.0	66.0	2
19						68.0	74.0	1
Basis								441

Volumes include stem and topwood, with bark, up to a minimum diameter of 2 inches. Average stump heights vary from 6 inches for small trees to 21 inches for large ones.

Table 39, U. S. Forest Service Bul. 96, Second Growth Hardwoods in Connecticut. E. H. Frothingham. 1912.

Table 55

RED, BLACK AND SCARLET OAK

(Quercus sp.)

New York and Connecticut

Frothingham
Barrows — 1912 — Cubic Ties feet

Diameter breast high	Total height of tree—feet								Basis
	50		60		70		80		
	Ties	Top-wood	Ties	Top-wood	Ties	Top-wood	Ties	Top-wood	
Inches	*No.*	*Cu. ft.*	*No.*	*Cu. ft.*	*No.*	*Cu. ft.*	*No.*	*Cu. ft.*	*Trees*
10	1	8.4	1	10.8	1	12.9	1	15.0	24
11	1	9.0	1	10.8	2	12.6	2	14.2	35
12	2	9.8	2	11.1	2	12.6	3	13.1	33
13	2	11.1	2	12.2	3	12.7	4	12.5	30
14	2	12.3	4	13.0	5	13.1	5	12.4	13
15	4	13.7	4	14.0	5	13.5	7	12.2	12
16	4	15.7	4	15.3	6	14.2	7	12.1	5
17					7	14.6	8	12.1	4
18					8	14.8	10	11.5	2
19					8	15.2	11	11.8	1
Basis									159

All first-class ties, 6 by 8 inches by 8 feet.

NOTE—The volume in "topwood" (top and branches) was obtained by subtracting the aggregate cubic volume of tie logs to a minimum top diameter of 9 inches, outside bark, from the total used volume of the tree, in cubic feet (to a minimum diameter of 2 inches, outside bark).

Table 46, U. S. Forest Service Bul. 96, Second-Growth Hardwoods in Connecticut. E. H. Frothingham. 1912.

Table 56

RED OAK

(Quercus borealis maxima)

Southern Appalachians

Mulford **1906** Scribner Decimal C

Diameter breast high	Total height of tree—feet							Diameter inside bark of top	Basis
	40	50	60	70	80	90	100		
	Volume—board feet, in tens								
Inches								*Inches*	*Trees*
8	1.0	1.6	2.6	3.3	4.0	4.6		6	3
9	1.6	2.5	3.7	4.6	5.6	6.3		6	8
10	2.3	3.4	4.9	6.0	7.2	8.3	9.9	6	17
11	3	4.4	6.1	7.6	9.2	11	12	6	14
12	4	5.6	7.4	9.5	11	13	15	6	27
13	5	6.8	8.8	12	14	16	18	7	23
14		8.2	10	14	16	19	21	7	23
15		9.6	12	16	19	22	24	8	27
16		11	14	19	22	25	27	8	13
17		13	17	21	25	29	31	9	14
18			20	24	28	33	36	9	9
19			23	27	32	37	41	10	12
20			26	31	36	41	46	10	4
21				35	41	46	51	11	2
22				39	45	51	57	11	
23				43	50	57	63	12	
24				48	55	63	70	12	1
25				53	60	69	77	13	1
Total									198

Stump height, 1 foot. Based on taper curves; scaled mostly as 16.3-foot logs, with a few shorter logs where necessary.

Table 49, U. S. Dept. of Agr. Bul. Volume Tables for the Important Timber Trees of the United States. Part III.

Table 57

RED OAK

(Quercus borealis maxima)

Southern Appalachians

Mulford **1906** Scribner Decimal C

Diameter breast high	Number of 16-foot logs									Diameter inside bark of top	Basis
	1	1½	2	2½	3	3½	4	4½	5		
	Volume—board feet, in tens										
Inches										*Inches*	*Trees*
8	2.0	2.7	3	4	.....	.....	.....	.....	.....	6	.....
9	2.0	3.2	4	5	.....	.....	.....	.....	.....	6	1
10	2.0	3.6	5	6	8	.....	.....	.....	.....	6	2
11	2.1	4.3	6	8	10	12	.....	.....	.....	6	4
12	2.3	5.0	7	9	12	14	18	.....	.....	6	3
13	2.5	5.8	9	11	14	17	20	.....	.....	7	4
14	2.7	6.7	10	13	16	19	23	26	.....	7	9
15	3.0	7.7	12	15	18	22	26	30	.....	8	15
16	3.4	8.9	13	17	20	25	29	34	39	8	18
17	3.8	10	15	19	23	28	32	38	44	9	40
18	4.3	12	17	21	26	31	36	42	49	9	56
19	4.8	13	20	24	29	35	40	47	54	10	65
20	5.4	15	22	27	33	39	45	52	59	10	75
21	6.2	17	25	30	37	44	50	58	65	11	86
22	6.9	19	27	34	41	48	55	64	72	11	90
23	7.7	21	30	38	45	53	61	70	79	12	67
24	8.5	23	34	42	50	58	67	77	86	12	80
25	9.3	25	37	46	55	64	74	84	94	13	56
26	10	28	41	51	60	70	81	91	102	13	89
27	11	30	45	56	66	77	88	99	111	14	68
28	12	33	49	61	72	83	96	108	120	14	81
29	13	56	53	66	78	90	103	116	130	15	61
30	14	39	58	72	85	98	112	125	140	15	47
31	.....	42	63	77	91	105	120	135	151	16	45
32	.....	45	69	83	98	113	129	145	162	16	40
33	.....	48	74	89	105	121	138	156	173	17	49
34	.....	.....	80	95	112	129	148	167	186	17	30
35	.....	.....	86	101	118	138	157	179	199	18	22
36	.....	.....	92	107	125	146	168	191	214	18	17
37	.....	.....	.....	113	132	155	178	204	229	19	24
38	.....	.....	.....	119	139	164	189	217	245	19	11
39	.....	.....	.....	125	146	173	200	230	260	20	16
40	.....	.....	.....	131	154	182	212	243	276	20	15
41	.....	.....	.....	.....	161	191	224	257	293	21	6
42	.....	.....	.....	.....	168	200	236	272	310	21	3
43	.....	.....	.....	.....	175	209	247	286	327	22	3
44	.....	.....	.....	.....	183	218	259	301	345	22	2
Total	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1300

Based on taper curves; scaled mostly in 16.3-foot logs, with a few shorter logs where necessary. Height of stump, 2 feet.

Table 48, U. S. Dept. of Agr. Bul. Volume Tables for the Important Timber Trees of the United States. Part III.

Table 58

WHITE OAK

(Quercus alba)

Southern Appalachians

Ashe **1903** **Scribner Decimal C**

Diameter breast high	Number of 16-foot logs									Basis
	1	1½	2	2½	3	3½	4	4½	5	
	Volume—board feet, in tens									
Inches										*Trees*
10	2	3								3
11	2	4								8
12	2	5	7	8						10
13	2	7	9	11						12
14	3	8	11	14	16	18				23
15	3	10	13	16	19	21				41
16	3	11	15	19	22	26	29			31
17	4	13	18	22	26	30	34			39
18	4	15	20	25	30	34	39	44		40
19	5	17	22	28	34	39	44	50	56	75
20	5	19	25	31	38	44	50	56	63	57
21	6	21	28	35	42	50	56	63	70	105
22	7	23	30	39	47	55	62	70	77	96
23	8	25	33	43	52	61	69	77	85	111
24	8	28	36	46	57	66	76	85	93	112
25	9	30	39	50	62	73	83	93	103	106
26	10	32	42	54	67	79	91	103	114	94
27		34	45	58	73	86	99	112	125	97
28		36	48	62	79	94	108	123	137	83
29		39	51	66	86	102	117	133	148	75
30		41	55	70	93	110	127	144	161	56
31			58	75	100	119	137	155	174	56
32			61	79	106	126	146	165	185	36
33			65	84	114	135	158	179	200	21
34			68	89	122	144	168	192	214	23
35				95	129	152	179	204	230	10
36				100	137	160	189	217	245	13
37				106	144	169	200	231	261	9
38					152	178	210	243	278	7
39					160	187	221	258	294	6
40					168	196	232	272	310	1
Total										1436

Stump height, 2 feet. Top diameter inside bark equals one-half the diameter breast high, with a minimum of 5.5 inches. This table is based on taper curves, read every 8.15 feet above stump.

U. S. Forest Service Form 874-aa.

Table 59

SECOND-GROWTH WHITE OAK

(Quercus alba)

Hyde Park, N. Y.

Peters | 1905 | Cubic feet

Diameter breast high	Total height of tree—feet					Basis
	20	30	40	50	60	
	Cordwood volume—cubic feet					
Inches						*Trees*
2	0.2	0.5				32
3	0.5	0.8	1.1			48
4	0.9	1.4	1.8			71
5		2.3	2.7	3.2		61
6		3.4	4.0	4.8	5.7	44
7		4.8	5.7	6.6	7.9	40
8			7.7	9.0	10.6	26
9				11.8	13.6	4
10				15.3	17.3	8
11				19.6	22.6	7
12				24.6	28.0	7
13					32.2	1
Basis	48	90	106	78	27	349

Volume includes all of the tree that may be utilized for cordwood down to 1 inch in diameter. A cord made up of mixed diameters of second-growth wood is considered to contain 78 cubic feet of solid wood, and this table can be reduced to cords by dividing by 78.

Table 45, U. S. Dept. of Agr. Bul. Volume Tables for the Important Timber Trees of the United States. Part III.

Table 60

WHITE OAK

(Quercus sp.)

New York and Connecticut

Frothingham
Barrows

1912

Diameter breast high	Diameter average stick	Solid contents of cord
Inches		*Cubic feet*
1		
2	1.8	63
3	2.5	69
4	3.1	74
5	3.5	76
6	3.9	79
7	4.2	81
8	4.5	82
9	4.7	83
10	4.9	84
11	5.0	85
12	5.1	85
13	5.2	85
14	5.2	85
15	5.3	86
16	5.4	86

Based on a large number of stacked standard cords 4x4x8 feet, consisting of mixed round and split four-foot wood.

Table 41, U. S. Forest Service Bul. 96, Second Growth Hardwoods in Connecticut. E. H. Frothingham. 1912.

Table 61

JACK PINE

(*Pinus banksiana*)

Lake States

Wackerman, A. E. **1925** International ⅛ inch kerf.

Diameter breast high	Total height of tree—feet													Top Cu. ft.	Basis
	30	35	40	45	50	55	60	65	70	75	80	85	90		
	Volume—board feet														
Inches															*Trees*
6	4	6	7	9	11	13	16	19	21	.....	.....	.....	.....	1.6	242
7	7	11	14	18	21	25	29	34	35	.....	.....	.....	.....	1.4	227
8	.....	17	21	25	30	34	39	42	48	52	.....	.....	.....	1.3	218
9	.....	.....	28	33	40	44	51	56	62	69	.....	.....	.....	1.1	126
10	.....	.....	.....	42	50	58	64	72	78	86	95	106	.....	1.0	74
11	.....	.....	.....	.....	60	70	81	90	99	108	118	128	139	1.0	58
12	.....	.....	.....	.....	.....	86	98	109	120	132	144	156	169	.9	46
13	.....	.....	.....	.....	.....	103	118	132	145	158	172	187	201	.9	27
14	.....	.....	.....	.....	.....	.....	144	159	175	191	209	226	244	.8	8
15	.....	.....	.....	.....	.....	.....	168	186	204	224	243	264	284	.8	3
16	.....	.....	.....	.....	.....	.....	200	221	242	265	289	312	336	.8	3
Basis	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1032

Volume above a 1-foot stump to a top diameter of 5 inches inside bark.
Top cubic feet is the merchantable volume in 8-foot lengths above 5 inches in the top to 3 inches outside bark.
For saws cutting a ¼-inch kerf, reduce the values by 9½ per cent.
Block indicates extent of original data.

Table 62

JACK PINE

(Pinus banksiana)

Lake States

Wackerman, A. E. **1925** Scribner Decimal C

Diameter breast high	Total height of tree—feet											Top Cu. ft.	Basis
	40	45	50	55	60	65	70	75	80	85	90		
	Volume—board feet, in tens												
Inches													*Trees*
7	.2	.5	.8	1.3	1.6	1.9	2.1					2.7	227
8	.8	1.3	1.8	2.4	2.8	3.3	3.8	4.3				2.4	218
9	1.6	2.2	2.8	3.5	4.2	4.7	5.2	5.7				2.2	126
10		3.0	3.7	4.5	5.2	5.9	6.6	7.1	7.7	8.2		2.0	74
11			4.8	5.7	6.5	7.3	8.0	8.8	9.6	10.3		1.8	58
12				7.0	8.0	8.9	9.9	10.8	11.8	12.6	13.6	1.7	46
13				8.2	9.2	10.3	11.3	12.5	13.6	14.5	15.7	1.5	27
14					11.3	12.5	13.8	15.1	16.2	17.6	18.6	1.4	8
15					13.1	14.6	15.9	17.5	18.6	20.2	21.4	1.3	3
16					15.0	16.8	18.5	20.3	21.8	23.5	25.4	1.3	3
Basis													790

Volume above a 1-foot stump to a top diameter of 6 inches inside bark.
Top cubic feet is the merchantable volume in 8-foot lengths above 6 inches in the top to 3 inches outside of bark.
Block indicates extent of original data.

Table 63

JACK PINE

(Pinus banksiana)

Cass County, Minnesota

Hansen — **1919** — Scribner

Diameter breast high	Number of 16-foot logs									
	½	1	1½	2	2½	3	3½	4	4½	5
	Volume—board feet									
Inches										
7	5	20	30	40						
8	5	20	30	50						
9		20	35	50	65	80				
10		20	35	50	65	85	100			
11		20	40	60	80	100	120	140		
12			40	65	85	110	135	160		
13			50	75	100	125	150	175		
14				80	110	140	175	205	235	270
15				90	130	165	200	235	270	310
16					145	185	230	270	310	350
17					155	200	245	290	340	390
18					170	220	270	320	370	420
19					180	230	280	330	380	430
20					190	240	295	345	400	450
21					205	260	315	370	425	480
22						280	340	400	460	520
23						305	370	440	500	570
24						345	410	480	550	620

Revised, 1926.

Top diameter inside bark, 6 inches; Stump height, 9 to 12 inches. Based on 305 trees. Trees scaled as felled.

Table 64

JACK PINE

(Pinus banksiana)

Lake States

Wackerman, A. E. **1925** Merchantable cords

Diameter breast high	Total height of tree—feet														Basis
	25	30	35	40	45	50	55	60	65	70	75	80	85	90	
	Unpeeled volume—cords														
Inches															*Trees*
4	.01	.01	.02	.02	.02	.03	.03	.03							151
5	.02	.02	.03	.03	.03	.04	.04	.04	.05	.05					221
6		.03	.04	.04	.05	.05	.06	.06	.07	.07					242
7		.04	.05	.05	.06	.06	.07	.08	.08	.09					227
8			.06	.07	.08	.08	.09	.10	.11	.12	.13	.14			218
9				.08	.09	.10	.11	.12	.13	.14	.15	.16			126
10					.11	.12	.13	.15	.16	.17	.19	.20	.22		74
11						.14	.16	.17	.19	.21	.22	.23	.25	.27	58
12							.19	.21	.22	.24	.26	.27	.29	.31	46
13							.22	.24	.26	.28	.30	.32	.34	.36	27
14								.28	.30	.32	.34	.37	.39	.41	8
15								.31	.34	.36	.39	.41	.44	.47	3
16								.35	.38	.41	.44	.47	.50	.53	3
Basis															1404

Standard cords 4x4x8 feet.

Volume includes stem and bark above a 1-foot stump to a top diameter of 3 inches outside bark.

Compiled from the merchantable volume table in cubic feet by converting by the number of cubic feet of wood per cord—based on D. B. H.

Block indicates extent of original data.

Table 65

JACK PINE

(Pinus banksiana)

Lake States

Wackerman, A. E. **1925** Total cubic feet

Diameter breast high	Total height of tree—feet														Form factor	Basis
	25	30	35	40	45	50	55	60	65	70	75	80	85	90		
	Total unpeeled volume—cubic feet															
Inches																*Trees*
3	.8	1.0	1.2	1.3	1.5	1.7	1.8								.67	75
4	1.3	1.6	1.9	2.2	2.4	2.7	3.0	3.2							.62	151
5	2.0	2.4	2.8	3.2	3.5	3.9	4.3	4.7	5.1	5.5					.58	221
6		3.2	3.8	4.3	4.9	5.4	5.9	6.5	7.0	7.6					.55	242
7		4.2	4.9	5.6	6.3	6.9	7.6	8.3	9.0	9.7					.52	227
8			6.1	7.0	7.9	8.7	9.6	10.5	11.3	12.2	13.1				.50	218
9				8.7	9.7	10.8	11.9	13.0	14.1	15.2	16.2				.49	126
10					11.8	13.1	14.4	15.7	17.0	18.3	19.6	20.9	22.2		.48	74
11						15.5	17.1	18.6	20.2	21.7	23.3	24.8	26.4	27.9	.47	58
12							19.9	21.7	23.5	25.3	27.1	28.9	30.7	32.5	.46	46
13							22.8	24.9	27.0	29.1	31.2	33.2	35.2	37.4	.45	27
14								28.9	31.3	33.7	36.5	38.5	40.9	43.3	.45	8
15								32.4	35.1	37.8	40.6	43.2	46.0	48.6	.44	3
16								36.9	40.0	43.0	46.1	49.2	52.2	55.3	.44	3
Basis																1479

Volume includes stump, stem, top, and bark.

Difference between total volume of trees used as a basis and the volumes taken from the table, +.087 per cent.

Block indicates extent of original data

Table 66

JACK PINE

(Pinus banksiana)

Lake States

Wackerman, A. E. **1925** Merchantable cubic feet

Diameter breast high	Total height of tree—feet														Basis
	25	30	35	40	45	50	55	60	65	70	75	80	85	90	
	Unpeeled volume—cubic feet														
Inches															*Trees*
4	.8	1.0	1.2	1.4	1.6	1.8	2.0	2.1							151
5	1.5	1.8	2.2	2.5	2.7	3.0	3.3	3.6	3.9	4.2					221
6		2.7	3.2	3.6	4.1	4.5	4.9	5.4	5.9	6.4					242
7		3.7	4.3	4.9	5.5	6.1	6.7	7.3	7.9	8.5					227
8			5.6	6.3	7.1	7.8	8.6	9.5	10.2	11.0	11.8	12.6			218
9				7.9	8.8	9.8	10.8	11.8	12.8	13.8	14.7	15.7			126
10					10.8	12.1	13.2	14.4	15.6	16.8	18.0	19.2	20.4		74
11						14.4	15.9	17.3	18.8	20.2	21.7	23.1	24.6	25.9	58
12							18.7	20.4	22.1	23.9	25.5	27.2	28.8	30.5	46
13							21.4	23.4	25.4	27.3	29.3	31.2	33.2	35.1	27
14								27.4	29.7	32.0	34.3	36.6	38.9	41.1	8
15								30.8	33.3	35.9	38.5	41.0	43.7	46.2	3
16								35.4	38.4	41.3	44.3	47.2	50.2	53.1	3
Basis															1404

Volume includes stem and bark above a 1-foot stump to a top diameter of 3 inches outside bark.

Compiled from the total volume table by percentages varying with D. B. H.

Block indicates extent of original data.

Table 67

JACK PINE

(Pinus banksiana)

Western Ontario

Sterrett
Ellis **1911** **Ties**

Diameter breast high	Total height (average)	Age (average)	Number of ties				Equivalent in board feet
			No. 1, 7″ x 7″ x 8′	No. 2, 6″ x 6″ x 8′	Cull, 5″ x 5″ x 8′	Total	
Inches	*Feet*	*Years*					
10	56	48	.....	0.8	1.1	1.9	37
11	61	55	0.3	2.0	1.0	3.3	74
12	66	62	1.2	1.8	.8	3.8	94
13	70	70	2.2	1.5	.8	4.5	119
14	74	80	3.2	1.5	.4	5.1	145
15	77	91	3.8	1.3	.3	5.4	158
16	81	107	4.0	1.2	.2	5.4	160

Basis, 100 trees.
Table 9, Forest Quarterly, March, 1911.
Table 28, U. S. Dept. of Agr. Bul. 820, The Jack Pine. 1920.

Table 68

RED PINE

(Pinus resinosa)

Minnesota, Wisconsin

Chapman
E. S. Bruce
Woolsey — **1913** — Scribner Decimal C

Diameter breast high	Total height of tree—feet										Basis
	30	40	50	60	70	80	90	100	110	120	
	Volume—board feet, in tens										
Inches											*Trees*
8	1.0	1.3	1.7	3	3	4	5	6	.....	.....	127
9	1.4	2.0	2.8	4	5	6	8	9	.....	.....	144
10	2.0	2.8	4.0	5	7	8	10	12	.....	.....	213
11	.....	3.8	5.3	7	9	11	13	15	.....	.....	256
12	.....	4.8	6.7	9	11	13	15	18	21	.....	315
13	.....	6.0	8.1	10	13	16	18	21	24	.....	351
14	.....	7.0	9.6	12	16	19	21	25	28	.....	345
15	.....	.....	11.0	15	18	22	25	29	32	.....	362
16	.....	.....	13.0	17	21	25	29	33	36	39	338
17	.....	.....	14.0	19	24	29	33	37	41	44	297
18	.....	.....	16.0	22	28	33	38	42	46	50	278
19	.....	.....	.....	26	32	38	43	48	52	56	233
20	.....	.....	.....	29	36	43	49	54	59	63	202
21	.....	.....	.....	.....	40	48	55	61	67	71	178
22	.....	.....	.....	.....	45	54	62	69	75	80	156
23	.....	.....	.....	.....	50	60	68	76	83	89	114
24	.....	.....	.....	.....	55	66	76	85	92	99	98
25	.....	.....	.....	.....	60	72	84	94	102	109	100
26	.....	.....	.....	.....	66	79	92	103	112	120	66
27	.....	.....	.....	.....	.....	86	100	112	122	131	55
28	.....	.....	.....	.....	.....	94	109	122	133	143	13
29	.....	.....	.....	.....	.....	102	117	132	144	156	14
30	.....	.....	.....	.....	.....	109	126	142	156	170	9
31	.....	.....	.....	.....	.....	.....	136	153	169	185	5
32	.....	.....	.....	.....	.....	.....	146	164	182	200	5
33	.....	.....	.....	.....	.....	.....	155	175	196	216	2
34	.....	.....	.....	.....	.....	.....	165	187	210	232	1
Total	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4282

Beltrami, Cass, Hubbard, and Itasca Counties, Minn.; Bayfield County, Wis. Height of stump, 2 feet. Top diameter inside bark, 6 inches. Based on taper curves, scaled mostly in 16.3-foot logs, with a few shorter logs where necessary. Table 19, U. S. Dept. of Agr. Bul. 139, Norway Pine in the Lake States. 1915.

Table 69

RED PINE

(Pinus resinosa)

Minnesota, Wisconsin

Chapman
E. S. Bruce
Woolsey

1913 Scribner Decimal C

Diameter breast high	Number of 16-foot logs													Basis
	1	1½	2	2½	3	3½	4	4½	5	5½	6	6½	7	
	Volume—board feet, in tens													
Inches														*Trees*
8	2.0	3.0	4.0	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	127
9	2.0	3.4	4.8	6	8	.....	.....	.....	.....	.....	.....	.....	.....	144
10	2.0	4.1	5.7	7	9	10	.....	.....	.....	.....	.....	.....	.....	213
11	2.0	4.2	6.2	8	10	12	14	.....	.....	.....	.....	.....	.....	256
12	2.0	5.2	7.4	9	12	14	16	19	.....	.....	.....	.....	.....	315
13	2.0	5.6	8.3	11	13	16	18	21	24	.....	.....	.....	.....	351
14	2.0	6.3	9.6	12	15	18	21	24	27	.....	.....	.....	.....	345
15	.....	7.1	11.0	14	17	20	23	27	30	34	.....	.....	.....	362
16	.....	7.8	12.0	15	19	23	26	30	34	38	.....	.....	.....	338
17	.....	.....	13.0	17	21	25	30	34	39	43	48	.....	.....	297
18	.....	.....	14.0	19	23	28	33	38	44	49	55	.....	.....	278
19	.....	.....	.....	20	26	32	38	43	49	55	62	68	.....	233
20	.....	.....	.....	22	29	35	42	49	55	62	68	75	82	202
21	.....	.....	.....	.....	31	39	47	54	61	68	75	82	88	178
22	.....	.....	.....	.....	34	43	52	60	68	75	82	89	95	156
23	.....	.....	.....	.....	38	48	57	66	74	82	89	96	103	114
24	.....	.....	.....	.....	42	53	63	73	82	90	97	104	111	98
25	.....	.....	.....	.....	.....	60	70	79	89	98	106	113	120	100
26	.....	.....	.....	.....	.....	66	76	86	96	106	114	123	131	66
27	.....	.....	.....	.....	.....	72	83	94	104	114	124	133	143	55
28	.....	.....	.....	.....	.....	79	90	101	112	123	135	145	156	18
29	.....	.....	.....	.....	.....	.....	96	108	120	133	145	158	170	14
30	.....	.....	.....	.....	.....	.....	103	116	130	143	157	171	185	9
31	.....	.....	.....	.....	.....	.....	110	124	139	153	169	184	200	5
32	.....	.....	.....	.....	.....	.....	.....	133	149	165	182	198	214	5
33	.....	.....	.....	.....	.....	.....	.....	142	159	177	195	213	230	2
34	.....	.....	.....	.....	.....	.....	.....	152	171	190	209	228	248	1
Total	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4282

Beltrami, Cass, Hubbard, and Itasca Counties, Minn.; Bayfield County, Wis. Height of stump, 2 feet. Top diameter inside bark, 6 inches. Based on taper curves; scaled mostly in 16.3-foot logs, with a few shorter logs where necessary. Table 17, U. S. Dept. of Agr. Bul. Volume Tables for the Important Timber Trees of the United States. Part II.

Table 70

RED PINE

(*Pinus resinosa*)

Itasca County, Minn.

E. S. Bruce — **1902** — Cubic feet

Diameter breast high	Total height of tree—feet							Basis
	40	50	60	70	80	90	100	
	Peeled volume—cubic feet							
Inches								*Trees*
5	2.7	3.3	4.2					6
6	3.8	4.8	5.8					19
7	5.0	6.3	7.8	9.0				34
8	6.5	8.2	10.1	11.9	13.9			26
9	8.1	10.2	12.6	15.0	17.5	19.8		39
10	9.9	12.6	15.3	18.2	21.0	24.0	27	34
11		15.2	18.3	21.0	25.0	29.0	32	38
12		18.2	21.0	25.0	29.0	34.0	38	34
13		21.0	25.0	29.0	34.0	39.0	45	23
14			29.0	33.0	39.0	46.0	52	18
15				37.0	44.0	52.0	60	9
16					51.0	60.0	68	10
17					57.0	67.0	77	5
18					64.0	75.0	86	4
19					71.0	83.0	94	2
20					79.0	91.0	103	2
Basis								303

Table 20, U. S. Dept. of Agr. Bul. 139, Norway Pine in the Lake States. 1915

Table 71

RED PINE

(*Pinus resinosa*)

Minnesota, Wisconsin

Chapman, H. H. **1905** Cubic feet

Diameter breast high	Total height of tree—feet									Basis
	40	50	60	70	80	90	100	110	120	
	Volume—cubic feet									
Inches										*Trees*
7	7.0	8.0	9.5	10.5	11.5	.....	.....	.....	.....	5
8	8.0	9.5	11.5	13.0	15.0	.....	.....	.....	.....	15
9	10.0	12.0	14.0	16.0	18.5	.....	.....	.....	.....	17
10	12.0	14.0	16.5	19.5	22.5	25.5	.....	.....	.....	32
11	.....	17.0	20.0	23.0	27.0	30.5	.....	.....	.....	29
12	.....	19.5	23.5	27.0	31.5	36.5	.....	.....	.....	51
13	.....	.....	27.5	31.5	36.5	43.0	49.5	.....	.....	47
14	.....	.....	32.0	36.5	42.5	49.5	57.5	.....	.....	32
15	.....	.....	37.0	42.0	49.0	56.5	65.0	.....	.....	34
16	.....	.....	42.0	47.5	55.5	63.5	73.0	.....	.....	34
17	.....	.....	.....	53.5	62.0	71.0	81.0	.....	.....	39
18	.....	.....	.....	.....	68.5	78.5	89.0	97.0	.....	40
19	.....	.....	.....	.....	76.0	86.5	97.0	105.0	.....	36
20	.....	.....	.....	.....	83.5	95.0	106.0	114.5	.....	33
21	.....	.....	.....	.....	92.0	103.0	115.0	125.0	139.0	34
22	.....	.....	.....	.....	101.0	112.0	125.0	137.0	153.0	34
23	.....	.....	.....	.....	111.0	122.0	135.0	150.0	167.0	19
24	.....	.....	.....	.....	120.0	131.0	145.0	163.0	182.0	20
25	.....	.....	.....	.....	129.0	142.0	157.0	177.0	197.0	28
26	.....	.....	.....	.....	138.0	152.0	169.0	191.0	214.0	15
27	.....	.....	.....	.....	148.0	162.0	181.0	206.0	230.0	10
28	.....	.....	.....	.....	.....	173.0	193.0	219.0	246.0	4
29	.....	.....	.....	.....	.....	183.0	205.0	233.0	262.0	3
30	.....	.....	.....	.....	.....	193.0	217.0	247.0	277.0	2
Total	.....	.....	.....	.....	.....	.....	.....	.....	.....	613

Itasca County, Minnesota, and Bayfield County, Wisconsin.
This table of volumes includes entire stem except a 1-foot stump.

Table 72

WHITE PINE

(*Pinus strobus*)

Northern Minnesota

E. S. Bruce — **1912** — Scribner

Diameter breast high	Total height of tree—feet											Diameter inside bark of top	Basis
	40	50	60	70	80	90	100	110	120	130	140		
	Volume—board feet												
Inches												*Inches*	*Trees*
8	20	25	30	35	45	.....	.....	.....	.....	.....	.....	6	129
9	25	35	45	50	60	.....	.....	.....	.....	.....	.....	6	220
10	35	45	55	65	75	90	.....	.....	.....	.....	.....	6	248
11	40	55	65	80	95	110	125	.....	.....	.....	.....	7	279
12	50	65	80	95	115	130	150	.....	.....	.....	.....	7	279
13	55	75	95	115	135	155	175	.....	.....	.....	.....	7	271
14	65	90	110	135	155	180	205	230	.....	.....	.....	7	234
15	.....	105	130	155	180	210	235	265	.....	.....	.....	7	246
16	.....	120	150	180	210	245	275	300	.....	.....	.....	7	222
17	.....	.....	170	205	240	280	310	345	.....	.....	.....	8	259
18	.....	.....	190	235	275	315	355	390	.....	.....	.....	8	202
19	.....	.....	215	265	310	355	400	440	.....	.....	.....	8	190
20	.....	.....	.....	295	350	400	450	495	535	.....	.....	9	163
21	.....	.....	.....	330	390	450	500	560	600	.....	.....	9	155
22	.....	.....	.....	370	430	500	560	620	670	.....	.....	9	118
23	.....	.....	.....	.....	480	550	620	680	730	.....	.....	10	106
24	.....	.....	.....	.....	530	610	680	750	810	860	920	10	85
25	.....	.....	.....	.....	590	670	750	820	880	950	1020	10	99
26	.....	.....	.....	.....	650	730	810	890	960	1040	1110	11	68
27	.....	.....	.....	.....	710	800	870	960	1040	1130	1210	11	63
28	.....	.....	.....	.....	780	860	940	1030	1120	1220	1310	11	56
29	.....	.....	.....	.....	.....	930	1000	1100	1200	1310	1410	12	37
30	.....	.....	.....	.....	.....	1000	1070	1180	1280	1400	1510	12	37
31	.....	.....	.....	.....	.....	.....	1140	1250	1370	1490	1600	12	36
32	.....	.....	.....	.....	.....	.....	1210	1330	1450	1570	1700	12	24
33	.....	.....	.....	.....	.....	.....	1280	1400	1530	1660	1790	13	23
34	.....	.....	.....	.....	.....	.....	1350	1480	1610	1750	1880	13	15
35	.....	.....	.....	.....	.....	.....	1420	1550	1690	1830	1970	13	12
36	.....	.....	.....	.....	.....	.....	1490	1630	1770	1910	2060	13	8
37	.....	.....	.....	.....	.....	.....	1560	1700	1850	2000	2150	13	4
38	.....	.....	.....	.....	.....	.....	1630	1780	1930	2080	2240	13	3
39	.....	.....	.....	.....	.....	.....	.....	1860	2020	2170	2330	13	6
40	.....	.....	.....	.....	.....	.....	.....	1940	2100	2260	2420	14	3
Total	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3899

Height of stump, 0.5-3.5 feet. Deductions for defect made in field.
Table 22, U. S. Dept. of Agr. Bul. 13, White Pine Under Forest Management. 1914.

Table 73

WHITE PINE

(*Pinus strobus*)

Minnesota

Barrows **1913** **Scribner Decimal C**

Diameter breast high	Total height of tree—feet: 40	50	60	70	80	90	100	110	Basis
	Volume—board feet, in tens								
Inches									*Trees*
8	2.0	2.7	3.4	4.6	5	6	.....	.....	119
9	2.8	3.5	4.3	5.8	7	8	.....	.....	181
10	3.4	4.4	5.4	7.1	8	10	11	.....	189
11	4.1	5.4	6.8	9	10	12	13	.....	215
12	5.0	6.6	8.2	10	12	14	16	18	198
13	5.8	7.9	9.8	12	14	17	19	21	210
14	6.6	9.3	12.0	14	17	20	22	24	189
15	7.4	11.0	14.0	16	19	23	25	28	54
16	8.3	13	16	19	22	26	28	32	39
17	9.3	15	18	21	25	29	32	36	50
18	10.0	16	20	24	28	32	36	40	49
19	.....	18	23	27	31	36	40	45	67
20	.....	21	26	30	35	40	45	50	38
21	.....	.....	29	33	39	44	49	55	38
22	.....	.....	32	36	43	48	54	61	36
23	.....	.....	35	40	47	53	60	67	31
24	.....	.....	38	43	51	58	66	74	18
25	.....	.....	.....	47	55	64	72	80	24
26	.....	.....	.....	51	60	69	78	88	18
27	.....	.....	.....	55	65	75	85	95	15
28	.....	.....	.....	59	70	81	92	103	11
29	.....	.....	.....	63	75	87	99	112	10
30	.....	.....	.....	67	81	94	107	120	19
31	.....	.....	.....	.....	87	101	115	129	4
32	.....	.....	.....	.....	93	109	124	139	3
33	.....	.....	.....	.....	100	117	133	149	.....
34	.....	.....	.....	.....	107	126	142	159	2
35	.....	.....	.....	.....	114	135	152	170	1
36	.....	.....	.....	.....	122	144	162	182	1
37	.....	.....	.....	.....	.....	153	173	193	3
38	.....	.....	.....	.....	.....	163	183	205	3
39	.....	.....	.....	.....	.....	173	194	217	2
40	.....	.....	.....	.....	.....	183	205	229	1
41	.....	.....	.....	.....	.....	192	216	242	.....
42	.....	.....	.....	.....	.....	202	228	255	2
Total	.....	.....	.....	.....	.....	.....	.....	.....	1834

Beltrami, Cass, and Itasca Counties, Minn.

Stump height, 1 foot. Top diameter inside bark, 6 inches. Based on taper curves; scaled mostly in 16.3-foot logs, with a few shorter logs where necessary. Old-growth trees.

Table 11, U. S. Dept. of Agr. Bul. Volume Tables for the Important Timber Trees of the United States. Part II.

Table 74

WHITE PINE

(Pinus strobus)

Frothingham
Barrows

Minnesota
1913

Scribner Decimal C

Diameter breast high	Number of 16-foot logs												Basis
	1½	2	2½	3	3½	4	4½	5	5½	6	6½	7	
	Volume—board feet, in tens												
Inches													*Trees*
8	2.8	4.0	5.6	6									119
9	3.1	4.4	6.0	7									181
10	3.6	5.0	6.7	8	10	11							189
11	4.0	5.6	7.4	9	11	13							215
12	4.3	6.3	8.3	10	13	15	18	21					198
13	4.9	7.0	9.4	12	14	17	20	23					210
14	5.3	8.0	11.0	14	17	19	22	25					189
15	5.9	8.9	12.0	15	18	21	24	28					54
16	6	10	13	17	20	24	27	31	34				39
17	7	11	15	19	22	26	30	34	38				50
18	8	12	17	21	25	29	33	37	42	47			49
19	8	14	19	23	27	32	36	41	46	51			67
20	9	15	21	25	30	35	40	45	50	56			38
21		17	23	27	33	38	44	49	55	61			38
22		18	25	30	35	42	48	53	60	66			30
23			27	32	38	45	52	58	65	73			31
24			29	35	41	49	56	63	71	79			18
25				37	44	53	61	68	77	86			24
26				39	47	57	65	74	84	94			18
27					51	61	70	80	91	102			15
28					54	65	75	86	98	109			11
29					57	69	80	92	105	117			10
30					61	73	85	99	112	125	140		19
31						78	91	106	120	134	149		4
32						83	97	113	128	143	158	175	3
33						87	104	121	136	152	168	185	
34						92	111	129	145	162	178	195	2
35							119	137	155	172	189	206	1
36							127	145	164	183	200	218	1
37							135	154	174	193	212	230	3
38							143	163	184	205	225	244	3
39							152	173	194	216	238	259	2
40							162	183	205	228	252	275	1
41							172	193	216	240	267	292	
42							182	203	227	252	282	310	2
Total													1834

Beltrami, Cass, and Itasca Counties, Minn.

Stump height, 1 foot. Top diameter inside bark, 6 inches.

Based on taper curves; scaled mostly in 16.3-foot logs, with a few shorter logs where necessary.

Table 6, U. S. Dept. of Agr. Bul. Volume Tables for the Important Timber Trees of the United States. Part II.

Table 75

SECOND-GROWTH WHITE PINE

(*Pinus strobus*)

Massachusetts

H. O. Cook — **1908** — Cords

Diameter breast high	Total height of tree—feet						
	30	40	50	60	70	80	90
	Volume—cords						
Inches							
5	0.03						
6	.03	0.04	0.05				
7	.04	.05	.07	0.09			
8	.05	.07	.09	.11	0.13		
9	.07	.09	.11	.13	.16		
10		.11	.13	.16	.19	0.22	
11		.13	.16	.19	.23	.26	0.30
12		.15	.19	.22	.27	.31	.35
13		.17	.22	.26	.31	.36	.40
14			.25	.30	.34	.41	.45
15			.28	.34	.40	.46	.51
16			.32	.38	.44	.52	.58
17				.42	.49	.58	.64
18				.47	.55	.64	.71
19				.51	.60	.70	.79
20				.55	.66	.77	.87
21					.72	.85	.95
22					.78	.92	1.04
23					.84	1.01	1.13
24					.90	1.08	1.22
25					.97	1.16	1.32
26							1.42
27							1.51

Volume includes bark; stump height, 6 inches; top diameter, 4 inches.
Volume scaled by the Humphrey caliper rule for stacked cordwood.
From "Forest Mensuration of White Pine in Massachusetts."

Table 76

SECOND-GROWTH WHITE PINE

(Pinus strobus)

Southern New Hampshire

L. Margolin — Cubic feet

Diameter breast high	Total height of tree—feet										Basis
	30	40	50	60	70	80	90	100	110	120	
	Total volume—cubic feet										
Inches											*Trees*
5	2.3	3.0	3.6								7
6	3.0	4.3	5.1	6.0	6.5						41
7	4.1	5.7	6.9	8.2	9.2						75
8	5.4	7.1	8.8	10.5	12.2	13.9	15.8				128
9	6.9	8.8	10.9	13.0	15.4	17.8	20.2				156
10	8.6	10.5	13.1	15.8	18.9	21.9	25.0				177
11		12.3	15.5	18.7	22.5	26.1	29.9				164
12		14.3	18.0	22.0	26.4	30.8	35.0	40.1	45.9		146
13		16.3	20.7	25.3	30.4	35.4	40.1	45.8	52.0		137
14			23.7	29.1	34.8	40.2	45.8	51.7	58.8		89
15			27.0	33.1	39.2	45.3	51.9	58.0	65.8		61
16			30.7	37.5	44.3	51.0	58.1	65.1	73.7		88
17			35.0	42.3	49.9	57.0	65.1	73.1	82.5		68
18			40.0	47.6	55.5	63.9	72.2	82.0	92.1	104.2	68
19				53.0	60.2	70.9	80.0	91.0	102.1	114.8	43
20					67.1	78.1	88.1	100.2	112.2	125.6	34
21					73.1	85.7	96.7	109.2	122.1	136.3	21
22					79.1	93.1	105.3	118.1	131.7	146.7	16
23						101.0	113.6	127.0	140.5	156.1	18
24						108.6	121.8	135.8	149.8	165.5	8
25						115.8	129.8	144.2	159.0	174.6	12
26						122.7	137.8	153.1	168.5	183.2	11
Total											1568

Volume includes stump, stem, top, and bark.

Table 26, U. S. Dept. of Agr. Bul. 13, White Pine under Forest Management, E. H. Frothingham. 1914.

Table 77

BLACK SPRUCE

(*Picea mariana*)

New York

Belyea **1922** Cords

Diameter breast high	Total height of tree—feet						
	20	30	40	50	60	70	80
	Volume—cords						
Inches							
4	.015	.018	.023				
5	.024	.030	.036	.045			
6	.035	.041	.050	.062	.082		
7		.056	.066	.082	.105		
8		.071	.084	.103	.132	.158	
9			.104	.126	.161	.182	
10			.127	.159	.188	.200	.230
11			.149	.171	.199	.226	.256
12			.171	.195	.226	.257	.295
13				.219	.256	.302	.348
14				.256	.297	.355	.412
15				.289	.341	.423	.489

Utilization to 3-inch top, average height of stump, 1 foot.
Based on 748 trees collected at Cranberry Lake, N. Y.
Table 64, New York State College of Forestry, Bul. No. 14, H. C. Belyea, O. M. Porter.

Table 78

BLACK SPRUCE

(Picea mariana)

New York

Belyea | **1922** | Cubic feet

Diameter breast high	Total height of tree—feet						
	20	30	40	50	60	70	80
	Total volume—cubic feet						
Inches							
4	1.48	1.78	2.31				
5	2.42	2.97	3.52	4.43			
6	3.46	4.07	4.95	6.20	8.17		
7		5.53	6.57	7.75	10.35		
8		7.04	8.32	10.15	12.97		
9			10.35	12.42	15.95	17.80	
10			12.55	15.85	18.65	19.80	22.75
11			14.78	16.95	19.70	22.30	25.30
12			16.95	19.25	22.20	25.35	29.12
13				21.40	25.30	29.80	34.15
14				25.30	29.45	35.15	40.65
15				28.55	34.25	41.85	48.45

Based on 748 trees collected in St. Lawrence County, New York.
Table 62, New York State College of Forestry, Bul. No. 14, H. C. Belyea, O. M. Porter.

Table 79

BLACK SPRUCE

(Picea mariana)

Algoma District, Ontario

McCarthy, E. F.
Mills, C. R.

1920

Cubic feet

Diameter breast high	Total height of tree—feet					Basis
	40	50	60	70	80	
	Total volume—cubic feet					
Inches						*Trees*
5	2.6					28
6	3.8	5.0				73
7	5.4	6.5	7.5			104
8	7.5	7.7	9.7	10.7		111
9		11.2	12.3	13.8		68
10		13.8	15.3	16.8	18.0	39
11		17.0	18.3	20.0	21.6	18
12			21.5	23.5	25.6	7
13			25.0	27.5	30.1	3
14			28.8	31.8	34.9	4
15					40.0	1
Basis						456

Softwood Type.
Data collected in the Agawa River Valley, Twp. 27, R. 20, Table of the Forestry Branch, Interior Dept., Canada.
Compiled by curving average values on D. B. H. and height.

Table 80

BLACK SPRUCE

(*Picea mariana*)

New York

Belyea **1922** Cubic feet

Diameter breast high	Total height of tree—feet						
	20	30	40	50	60	70	80
	Volume—cubic feet						
Inches							
4	1.35	1.62	2.10				
5	2.20	2.70	3.20	4.03			
6	3.15	3.70	4.50	5.63	7.42		
7		5.02	5.97	7.40	9.42		
8		6.40	7.55	9.25	11.75		
9			9.40	11.30	14.50	16.20	
10			11.40	14.40	16.95	18.00	20.70
11			13.45	15.40	17.90	20.25	23.00
12			15.40	17.50	20.20	23.05	26.50
13				19.80	23.00	27.10	31.00
14				23.00	26.80	32.00	37.00
15				26.00	30.75	38.00	44.00

Utilization to a 3-inch top. Average height of stump, 1 foot.
Based on 748 trees collected in St. Lawrence County, New York.
Table 63, New York State College of Forestry, Bul. 14, H. C. Belyea, O. M. Porter.

Table 81

BLACK SPRUCE

(Picea mariana)

Algoma District, Ontario

McCarthy, E. F.
Mills, C. R.

1920

Cubic feet

Diameter breast high	Total height of tree—feet					Basis
	40	50	60	70	80	
	Used volume—cubic feet					
Inches						*Trees*
5	2.0	2.5				28
6	2.6	3.5	4.7			73
7	3.5	4.9	6.2	7.2		104
8	4.5	6.2	7.9	9.3		111
9		7.9	9.7	11.4		68
10		9.6	11.7	13.6		39
11			14.0	16.2	18.9	18
12			16.5	19.0	21.9	7
13			19.6	22.0	25.4	3
14			22.6	25.5	29.1	4
15				29.6	33.2	1
Basis						456

Softwood Type.
Data collected in the Agawa River Valley, Twp. 27, R. 20, Table of the Forestry Branch, Interior Dept., Canada.
Compiled by curving average values on D. B. H. and height.

Table 82
WHITE SPRUCE
(Picea glauca)
Minnesota
1926

T. S. Hansen — Merchantable cords

Diameter breast high	Total height of tree—feet																			Basis
	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	
	Unpeeled volume—cords																			
Inches																				*Trees*
6	.03	.04	.05	.05	.06															1
7	.04	.05	.06	.06	.07	.08	.09	.09	.10											12
8		.06	.07	.08	.09	.10	.11	.12	.13	.14	.15									29
9		.08	.09	.11	.11	.13	.14	.15	.16	.17	.18	.19								36
10			.11	.12	.14	.15	.17	.18	.19	.21	.22	.23	.25							42
11				.14	.16	.18	.20	.21	.23	.24	.26	.28	.29							23
12				.17	.19	.21	.23	.24	.26	.28	.30	.32	.34							45
13				.20	.22	.24	.26	.28	.30	.32	.34	.37	.40	.41						19
14					.25	.27	.29	.32	.34	.37	.40	.42	.45	.48	.50					31
15					.27	.30	.33	.36	.38	.42	.45	.48	.50	.53	.55					22
16						.34	.38	.42	.43	.48	.50	.53	.55	.59	.62					17
17						.38	.42	.45	.50	.53	.55	.59	.62	.67	.71	.77				10
18						.43	.48	.50	.55	.59	.62	.67	.71	.77	.77	.83	.83			12
19						.48	.53	.55	.59	.62	.67	.71	.77	.83	.83	.90	.90	1.00		12
20							.55	.62	.67	.71	.77	.83	.83	.90	.90	1.00	1.00	1.11	1.11	3
21							.62	.67	.71	.77	.83	.83	.90	1.00	1.00	1.11	1 11	1.25	1.25	7
22							.67	.71	.77	.83	.90	.90	1.00	1.00	1.11	1.11	1.25	1.25	1.43	
Basis																				321

Standard cords 4x4x8 feet.
Unpeeled volume above a 1.5 foot stump to a top diameter outside of bark of 3 inches.
Compiled from the merchantable cubic feet volume table and a table for Jack pine giving the number of cubic feet per cord by D. B. H. classes. Data collected in Beltrami County in 1917 by J. H. Allison.
Block indicates extent of original data.

Table 83
WHITE SPRUCE
(*Picea glauca*)
Minnesota
1926

T. S. Hansen — Total cubic feet

Diameter breast high	Total height of tree—feet																			Basis
	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	
	Total volume—cubic feet																			
Inches																				*Trees*
6	3.3	3.9	4.5	5.0	5.6	6.1	6.7													1
7	4.4	5.1	5.9	6.6	7.3	8.1	8.8	9.5	10.3											12
8		6.6	7.5	8.5	9.4	10.4	11.3	12.3	13.2	14.1	15.1									29
9		8.2	9.4	10.5	11.7	12.9	14.0	15.2	16.4	17.5	18.7	19.9								35
10			11.3	12.8	14.2	15.6	17.0	18.5	19.8	21.3	22.7	24.1	25.5							42
11				15.1	16.8	18.5	20.2	21.9	23.5	25.2	26.9	28.6	30.1							23
12				17.6	19.6	21.6	23.6	25.5	27.5	29.4	31.4	33.4	35.3							45
13				20.4	22.7	25.0	27.2	29.5	31.9	34.2	36.4	38.6	40.8	43.2						19
14					25.9	28.5	31.2	33.7	36.2	38.9	41.6	44.0	46.7	49.2	51.7					31
15					29.4	32.4	35.4	38.3	41.2	44.2	47.1	50.1	53.1	55.9	58.8					22
16						36.5	39.8	43.1	46.4	49.7	53.0	56.3	59.6	63.0	66.2					17
17						40.7	44.5	48.2	52.0	55.6	59.3	62.8	66.6	70.2	74.0	77.7				10
18						45.1	49.4	53.4	57.5	61.6	65.7	70.0	74.0	78.0	82.1	86.4	90.5			12
19						49.6	54.1	58.5	62.9	67.5	72.1	76.6	81.2	85.6	90.0	94.5	99.2	103.9		12
20							59.2	64.2	69.1	74.1	79.0	84.0	89.0	93.8	98.9	103.8	108.6	114.0	118.6	3
21							64.2	69.6	75.0	80.2	85.6	91.1	96.5	101.9	107.2	112.6	117.9	123.2	128.5	7
22							69.7	75.5	81.2	87.0	92.9	98.4	104.1	110.0	116.0	122.1	128.0	133.6	139.5	
Basis																				321

Volume includes stump, stem, and bark.
Compiled by the Form Factor Method from data collected in Beltrami County in 1917 by J. H. Allison.
Difference between total volume of trees used as a basis and volumes taken from table, 0.3 per cent.
Block indicates extent of original data.

Table 84

WHITE SPRUCE

(Picea glauca)

Algoma District, Ontario

McCarthy, E. F.
Mills, C. R.

1920

Cubic feet

Diameter breast high	Total height of tree—feet						Basis
	40	50	60	70	80	90	
	Total volume—cubic feet						
Inches							*Trees*
5	2.6						
6	4.2	4.8					33
7	5.8	6.6	7.5				62
8	7.7	8.7	10.3	11.7			80
9	10.0	11.3	12.9	14.7			100
10		13.8	15.6	17.7	20.4		125
11		17.0	18.7	21.0	24.0		134
12			22.0	24.5	27.7		104
13			25.7	28.3	32.0		69
14			29.7	32.4	36.3	41.5	50
15				36.8	41.0	46.5	30
16				41.5	46.3	52.0	26
17					52.0	58.2	7
18					58.3	64.6	4
19						72.0	6
Basis							834

Softwood Type.
Data collected in the Agawa River Valley Twp. 27, R. 20, Table of the Forestry Branch, Interior Dept., Canada.
Compiled by curving average values on D. B. H. and height.

Table 85

WHITE SPRUCE

(*Picea glauca*)

Algoma District, Ontario

McCarthy, E. F.
Mills, C. R.

1920

Cubic feet

Diameter breast high	Total height of tree—feet					Basis
	40	50	60	70	80	
	Total volume—cubic feet					
Inches						*Trees*
7	5.8	6.3	6.8			40
8	7.5	8.6	9.6			42
9	9.5	11.2	12.6			49
10		14.1	16.0	17.0		54
11		17.3	19.5	20.9		57
12			23.1	25.0	26.8	42
13			27.2	29.3	31.3	39
14			31.8	34.0	36.0	32
15			36.5	39.0	41.3	15
16				44.5	47.0	5
17					53.3	6
18					59.8	2
19					66.0	3
Basis						386

Mixed Type.
Data collected in the Agawa River Valley Twp. 27, R. 20, Table of the Forestry. Branch, Interior Dept., Canada.
Compiled by curving average values on D. B. H. and height.

Table 86

WHITE SPRUCE

(Picea glauca)

Algoma District, Ontario

McCarthy, E. F.
Mills, C. R. **1920** Cubic feet

Diameter breast high	Total height of tree—feet					Basis
	40	50	60	70	80	
	Total volume—cubic feet					
Inches						*Trees*
6	3.6					33
7	5.6	6.5	7.1			102
8	7.8	8.8	9.9			144
9		11.5	12.9	14.5		159
10		14.5	16.0	17.5		167
11			19.6	21.0		166
12			23.2	24.8	27.7	122
13			27.2	28.8	32.0	84
14			31.6	33.2	36.6	64
15				38.3	41.7	36
16				44.0	47.3	26
17					53.5	6
18					59.5	6
19					65.6	3
Basis						1118

All Types.
Based on data collected in the Agawa River Valley, Twp. 27, R. 20, Table of the Forestry Branch, Interior Dept., Canada.
Compiled by curving average values on D. B. H. and height.

Table 87
WHITE SPRUCE
(Picea glauca)
Minnesota
1926

T. S. Hansen — Merchantable cubic feet

Diameter breast high	Total height of tree—feet																			Basis
	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	
	Unpeeled volume—cubic feet																			
Inches																				*Trees*
6	2.9	3.4	3.9	4.4	4.8	5.3	5.8													1
7	4.0	4.7	5.3	6.0	6.6	7.3	8.0	8.7	9.3											12
8		6.1	6.9	7.8	8.7	9.5	10.4	11.3	12.2	13.0	13.9									29
9		7.6	8.7	9.8	10.9	11.9	12.9	14.1	15.2	16.3	17.4	18.4								35
10			10.6	11.9	13.3	14.6	15.9	17.2	18.5	19.9	21.2	22.5	23.8							42
11				14.1	15.7	17.3	18.9	20.5	22.0	23.6	25.2	26.8	28.2							23
12				16.5	18.4	20.2	22.1	23.9	25.8	27.6	29.4	31.2	33.2							45
13				19.2	21.3	23.2	25.6	27.7	29.9	32.0	34.1	36.2	38.3	40.6						19
14					24.3	26.7	29.2	31.6	34.0	36.5	39.0	41.2	43.7	46.6	48.5					31
15					27.6	30.3	33.2	35.9	38.6	41.5	44.2	47.0	49.7	52.4	55.1					22
16						34.3	37.4	40.5	43.6	46.7	49.7	52.8	56.0	59.1	62.2					17
17						38.3	41.8	45.4	48.9	52.2	55.7	59.1	62.6	66.0	69.5	73.1				10
18						42.4	46.5	50.2	54.1	58.0	61.8	65.7	69.5	73.4	77.1	81.1	85.0			12
19						46.6	50.9	55.0	59.1	63.5	67.8	72.1	76.2	80.5	84.6	88.9	93.2	97.5		12
20							55.6	60.4	65.0	69.6	74.4	79.0	83.6	88.2	92.9	97.7	102.2	107.0	111.1	3
21							60.2	65.5	70.4	75.4	80.5	85.6	90.6	95.6	100.9	105.8	110.9	116.0	120.9	7
22							65.5	71.0	76.4	81.8	87.2	92.4	98.0	103.6	109.0	114.7	120.2	125.6	131.2	
Basis																				321

Volume above a 1.5-foot stump to a 3-inch top diameter outside of bark.
Compiled by expressing merchantable volume as a percentage of total volume and curving these values on D. B. H. Data collected in Beltrami County in 1917 by J. H. Allison.
Block indicates extent of original data.

Table 88

WHITE SPRUCE

(Picea glauca)

Minnesota

1926

T. S. Hansen — Merchantable cubic feet

Diameter breast high	Total height of tree—feet: 30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	Bark per cent	Basis
	Peeled volume—cubic feet																				
Inches																					*Trees*
6	2.3	2.7	3.1	3.5	3.9	4.3	4.7													19.6	1
7	3.3	3.8	4.4	4.9	5.5	6.0	6.6	7.2	7.7											17.5	12
8		5.1	5.8	6.6	7.3	8.0	8.8	9.5	10.2	10.9	11.7									16.0	29
9		6.5	7.4	8.3	9.3	10.2	11.1	12.1	13.0	13.8	14.8	15.8								14.5	35
10			9.1	10.3	11.5	12.6	13.8	14.9	16.0	17.2	18.3	19.5	20.6							13.5	42
11				12.4	13.8	15.1	16.5	17.9	19.2	20.6	22.0	23.2	24.3							12.5	23
12				14.5	16.2	17.8	19.4	21.0	22.6	24.3	25.9	27.5	29.2							12.0	45
13				17.0	18.9	20.6	22.6	24.5	26.5	28.3	30.2	32.0	33.9	36.0						11.5	19
14					21.6	23.8	26.0	28.1	30.2	32.5	34.7	36.7	39.0	41.5	43.2					11.0	31
15					24.6	27.0	29.6	32.0	34.4	36.9	39.3	41.8	44.3	46.6	49.0					11.0	22
16						30.7	33.4	36.2	39.0	41.7	44.5	47.2	50.1	53.0	55.7					10.5	17
17						34.2	37.4	40.6	43.7	46.7	49.9	53.0	56.0	59.1	62.2	65.5				10.5	10
18						38.0	41.6	45.0	48.5	51.9	55.4	58.7	62.2	65.6	69.0	72.6	76.1			10.5	12
19						41.8	45.5	49.3	53.0	56.9	60.7	64.6	68.4	72.1	75.9	79.5	83.5	87.4		10.4	12
20							50.0	54.2	58.4	62.5	66.7	71.0	75.1	79.3	83.4	87.9	92.0	96.1	100.0	10.2	3
21							54.2	58.9	63.3	67.7	72.5	77.0	81.5	86.0	90.6	95.0	99.6	104.3	108.5	10.1	7
22							59.0	63.9	68.7	73.6	78.5	83.1	88.2	93.1	98.0	103.1	108.4	113.0	118.2	10.0	
Basis																					321

Peeled volume above a 1.5-foot stump to a 3-inch top diameter outside of bark.

Compiled by reducing the unpeeled merchantable volume in cubic feet by means of bark percentages based on D. B. H. Data collected in Beltrami County in 1917 by J. H. Allison.

Block indicates extent of original data.

Table 89

WHITE SPRUCE

(*Picea glauca*)

Algoma District, Ontario

McCarthy, E. F.
Mills, C. R. **1920** Cubic feet

Diameter breast high	Total height of tree—feet					Basis
	40	50	60	70	80	
	Used volume—cubic feet					
Inches						*Trees*
6	3.0	3.2	3.6			33
7	4.4	4.8	5.6			102
8	6.0	7.0	8.0			144
9	8.0	9.5	10.8	11.7		159
10	10.2	12.2	13.8	14.9		167
11	12.6	15.2	18.2	18.3	19.6	166
12		18.5	20.8	22.0	23.5	122
13			24.6	26.4	27.8	84
14			28.7	30.8	32.6	64
15			33.0	35.5	37.6	36
16				40.5	43.0	26
17					49.0	6
18					55.0	6
19					61.0	3
Basis						1118

All Types.
Average stump height, 1.9 feet. Average top diameter inside bark, 5.5 inches.
Data collected in the Agawa River Valley, Twp 27, R. 20, Table of the Forestry Branch, Interior Dept., Canada.
Compiled by curving averages on height and D. B. H.

Table 90

TAMARACK

(*Larix laricina*)

St. Louis County, Minn.

Chapman **1905** Scribner Decimal C

Diameter breast high	Total height of tree—feet						Basis
	50	60	70	80	90	100	
	Volume—board feet, in tens						
Inches							*Trees*
8	2.3	2.9	4	5	5		27
9	3.0	3.9	5	6	7		49
10	3.9	5.1	6	8	9	10	127
11	4.8	6.3	8	10	11	13	96
12	5.8	7.6	9	11	13	15	122
13	6.9	8.9	11	13	16	18	48
14	8.0	10.0	13	15	18	21	38
15		12.0	15	18	21	24	21
16		13.0	16	20	23	27	6
17			18	22	26	30	1
18			20	25	29	34	3
19				27	32	37	
20				30	35	41	
Basis							538

Close utilization to top diameter of 5.5 inches inside bark, Scaled from taper curves, mostly in 16.3-foot logs, with a few shorter logs. Stump height, 1 foot.
Table 101, U. S. Dept. of Agr. Volume Tables for the Important Timber Trees of the United States. Part II.

Table 91

TAMARACK

(*Larix laricina*)

St. Louis County, Minn.

Chapman 1905 Scribner Decimal C

Diameter breast high	Number of 16-foot logs									Basis
	1	1½	2	2½	3	3½	4	4½	5	
	Volume—board feet, in tens									
Inches										*Trees*
8	1.4	2.8	3.9	5.3	7					27
9	1.8	3.2	4.6	6.0	8					49
10	2.1	3.6	5.2	6.8	9	10	11			127
11		4.1	5.8	7.6	10	11	13			96
12		4.6	6.5	8.4	11	12	15	17		122
13			7.2	9.3	12	14	17	20		48
14			7.9	10.0	13	15	19	22	26	38
15				11.0	14	17	21	24	28	21
16				12.0	15	19	23	26	31	6
17					17	21	25	29	33	1
18					18	22	27	31	36	3
19						24	29	34	39	
20						26	31	36	41	
Total										538

Close utilization to diameter of 5.5 inches inside bark at top. Scaled from taper curves, mostly in 16.3-foot logs, with a few shorter logs. Stump height, 1 foot.

Table 100, U. S. Dept. of Agr. Bul. Volume Tables for the Important Timber Trees of the United States. Part II.

Table 92

TAMARACK

(Larix laricina)

St. Louis County, Minn.

Chapman | **1905** | Cubic feet

Diameter breast high	Total height of tree—feet					Basis
	60	70	80	90	100	
	Peeled volume—cubic feet					
Inches						*Trees*
7	8.5	10.0				1
8	10.5	12.0				11
9	13.0	14.5	16.0			36
10	15.0	17.0	19.5	23.0	27.0	62
11		20.0	23.0	26.5	31.0	47
12		23.5	26.5	30.5	35.0	48
13		27.0	30.5	34.5	39.5	23
14		31.0	34.5	38.5	44.0	12
15			38.5	43.0	49.5	6
Total						246

Table 102, U. S. Dept. of Agr. Bul. Volume Tables for the Important Timber Trees of the United States. Part II.

Table 93

TAMARACK

(*Larix laricina*)

St. Louis County, Minnesota

H. H. Chapman **1905**

Diameter breast high	Number of ties			Basis
	7″x7″x8′	6″x6″x8′	Cull	
Inches				*Trees*
8			2.00	17
9	0.02	0.19	1.59	59
10	.13	1.15	1.21	111
11	.80	1.35	.90	121
12	1.73	1.38	.65	115
13	2.53	1.33	.48	64
14	3.10	1.20	.34	41
15	3.56	1.05	.43	22
16	3.97	.91	.55	6
17	4.34	.79	.68	1
18	4.68	.68	.83	3
Basis				560